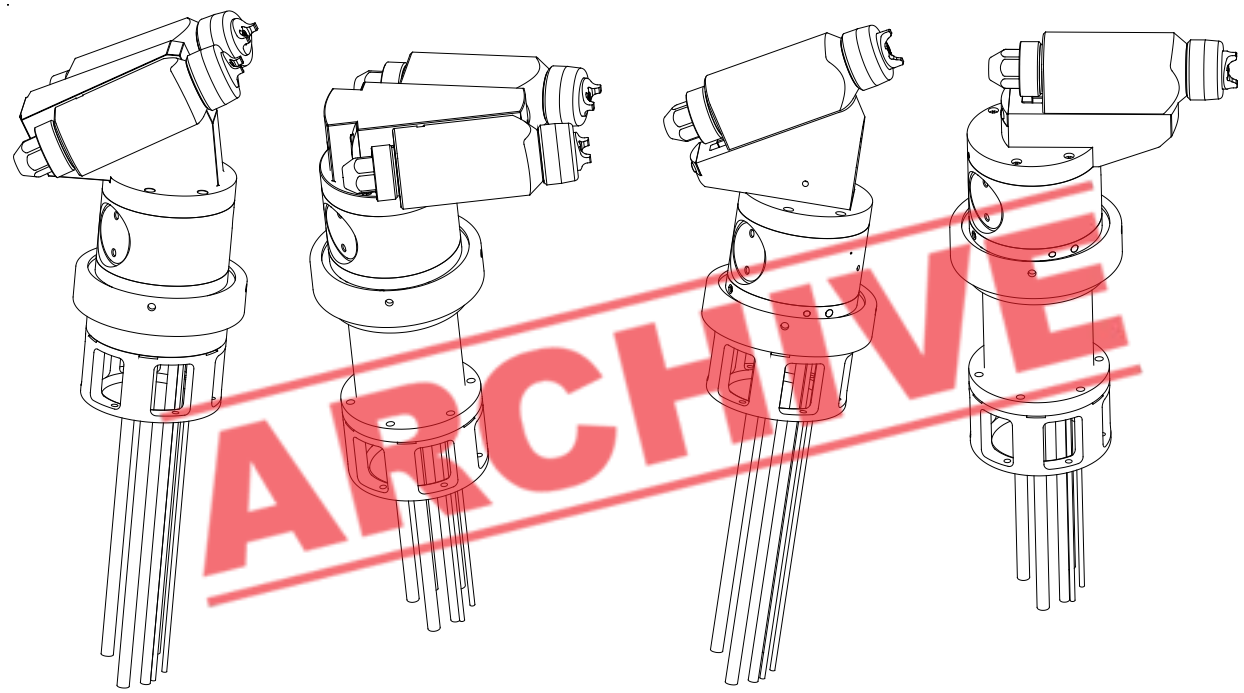
Ransburg

SERVICE MANUAL
AA-05-01.5
(Replaces AA-05-01.4)
January - 2013

EVOLVER™ NON-ELECTROSTATIC ROBOTIC MOUNTED ATOMIZERS



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MODELS: A11279-XX, A11281-XX, A11775-XX, A11776-XX

Service Manual Price: $50.00 (U.S.)

NOTE: This manual has been changed from revision AA-05-01.4 to revision AA-05-01.5. Reasons for this change are noted under "Manual Change Summary" inside the back cover of this manual.

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SAFETY

SAFETY PRECAUTIONS

Before operating, maintaining or servicing any Ransburg electrostatic coating system, read and understand all of the technical and safety literature for your Ransburg products. This manual contains information that is important for you to know and understand. This information relates to USER SAFETY and PREVENTING EQUIPMENT PROBLEMS. To help you recognize this information, we use the following symbols. Please pay particular attention to these sections.

A WARNING! states information to alert you to a situation that might cause serious injury if instructions are not followed.

A CAUTION! states information that tells how to prevent damage to equipment or how to avoid a situation that might cause minor injury.

A NOTE is information relevant to the procedure in progress.

While this manual lists standard specifications and service procedures, some minor deviations may be found between this literature and your equipment. Differences in local codes and plant requirements, material delivery requirements, etc., make such variations inevitable. Compare this manual with your system installation drawings and appropriate Ransburg equipment manuals to reconcile such differences.

Careful study and continued use of this manual will provide a better understanding of the equipment and process, resulting in more efficient operation, longer trouble-free service and faster, easier troubleshooting. If you do not have the manuals and safety literature for your Ransburg system, contact your local Ransburg representative or Ransburg.

WARNING

> The user MUST read and be familiar with the Safety Section in this manual and the Ransburg safety literature therein identified.

> This manual MUST be read and thoroughly understood by ALL personnel who operate, clean or maintain this equipment! Special care should be taken to ensure that the WARNINGS and safety requirements for operating and servicing the equipment are followed. The user should be aware of and adhere to ALL local building and fire codes and ordinances as well as NFPA-33 SAFETY STANDARD, prior to installing, operating, and/or servicing this equipment.

WARNING

> The hazards shown on the following page may occur during the normal use of this equipment. Please read the hazard chart beginning on page 2.

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AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Spray Area 	Fire Hazard Improper or inadequate operation and maintenance procedures will cause a fire hazard. Protection against inadvertent arcing that is capable of causing fire or explosion is lost if any safety interlocks are disabled during operation. Frequent power supply shutdown indicates a problem in the system requiring correction.	Fire extinguishing equipment must be present in the spray area and tested periodically. Spray areas must be kept clean to prevent the accumulation of combustible residues. Smoking must never be allowed in the spray area. The high voltage supplied to the atomizer must be turned off prior to cleaning, flushing or maintenance. When using solvents for cleaning: Those used for equipment flushing should have flash points equal to or higher than those of the coating material. Those used for general cleaning must have flash points above 100°F (37.8°C). Spray booth ventilation must be kept at the rates required by NFPA-33, OSHA, and local codes. In addition, ventilation must be maintained during cleaning operations using flammable or combustible solvents. Electrostatic arcing must be prevented. Test only in areas free of combustible material. Testing may require high voltage to be on, but only as instructed. Non-factory replacement parts or unauthorized equipment modifications may cause fire or injury. If used, the key switch bypass is intended for use only during set-up operations. Production should never be done with safety interlocks disabled. Never use equipment intended for use in waterborne installations to spray solvent based materials. The paint process and equipment should be set up and operated in accordance with NFPA-33, NEC, and OSHA requirements.

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AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
General Use and Maintenance 	Improper operation or maintenance may create a hazard. Personnel must be properly trained in the use of this equipment.	Personnel must be given training in accordance with the requirements of NFPA-33. Instructions and safety precautions must be read and understood prior to using this equipment. Comply with appropriate local, state, and national codes governing ventilation, fire protection, operation maintenance, and housekeeping. Reference OSHA, NFPA-33, and your insurance company require-ments.
Electrical Equipment 	High voltage equipment is utilized. Arcing in areas of flammable or combustible materials may occur. Personnel are exposed to high voltage during operation and maintenance. Protection against inadvertent arcing that may cause a fire or explosion is lost if safety circuits are disabled during operation. Frequent power supply shut-down indicates a problem in the system which requires correction. An electrical arc can ignite coating materials and cause a fire or explosion.	The power supply, optional remote control cabinet, and all other electrical equipment must be located outside Class I or II, Division 1 and 2 hazardous areas. Refer to NFPA-33. Turn the power supply OFF before working on the equipment. Test only in areas free of flammable or combustible material. Testing may require high voltage to be on, but only as instructed. Production should never be done with the safety circuits disabled. Before turning the high voltage on, make sure no objects are within the sparking distance.
Explosion Hazard / Incompatible Materials 	Halogenated hydrocarbon solvents for example: methylene chloride and 1,1,1,-Trichloroethane are not chemically compatible with the aluminum that might be used in many system components. The chemical reaction caused by these solvents reacting with aluminum can become violent and lead to an equipment explosion.	Aluminum is widely used in other spray application equipment - such as material pumps, regulators, triggering valves, etc. Halogenated hydrocarbon solvents must never be used with aluminum equipment during spraying, flushing, or cleaning. Read the label or data sheet for the material you intend to spray. If in doubt as to whether or not a coating or cleaning material is compatible, contact your material supplier. Any other type of solvent may be used with aluminum equipment.

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AREA Tells where hazards may occur.	HAZARD Tells what the hazard is.	SAFEGUARDS Tells how to avoid the hazard.
Toxic Substances 	Certain material may be harmful if inhaled, or if there is contact with the skin.	Follow the requirements of the Material Safety Data Sheet supplied by coating material manufacturer. Adequate exhaust must be provided to keep the air free of accumulations of toxic materials. Use a mask or respirator whenever there is a chance of inhaling sprayed materials. The mask must be compatible with the material being sprayed and its concentration. Equipment must be as prescribed by an industrial hygienist or safety expert, and be NIOSH approved.
Spray Area / High Voltage Equipment 	There is a high voltage device that can induce an electrical charge on objects which is capable of igniting coating materials. Inadequate grounding will cause a spark hazard. A spark can ignite many coating materials and cause a fire or explosion.	Parts being sprayed must be supported on conveyors or hangers and be grounded. The resistance between the part and ground must not exceed 1 megohm. All electrically conductive objects in the spray area, with the exception of those objects required by the process to be at high voltage, must be grounded. Any person working in the spray area must be grounded. Unless specifically approved for use in hazardous locations, the power supply and other electrical control equipment must not be used in Class 1, Division 1 or 2 locations.
Robot Work Area - General Use and Maintenance	Improper use or maintenance can lead to hazardous conditions, particularly from unexpected robot manipulator movement.	Applicator adjustments or maintenance should be done after the robot is taken out of service. Do not adjust or repair the applicator if the robot is operating or standing ready to start. Refer to robot operating instructions for the procedures to take the robot out of service.
Personnel Safety	Skin puncturing by sharp electrode.	Take precautions to see that flesh is not punctured by sharp electrode.

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INTRODUCTION

The Evolver NE (Non-Electrostatic)™ Solventborne Applicators consists of both 60° and 90° dual-head and 60° and 90° single-head spray applicators. Developed for use on robots, the Evolver applicator incorporates a unique 1/3 turn quick-disconnect spray head.

The dual-head applicators are primarily used where high volume fluid delivery is required. The dual-head applicator is available in two different configurations as follows (see Figure 2B):

A11279-XX 60° Dual-Head
A11281-XX 90° Dual-Head

The single-head applicatorss are primarily used where lower volume of fluid delivery is required. The single-head applicator is available in two different configurations as follows (see Figure 2B) :

A11775-XX 60° Single-Head
A11776-XX 90° Single-Head

The Evolver Spray Applicator System consists of four major components:

1. Quick-Disconnect Spray Head
2. Applicator Head Mounting Block Assembly
3. Valve Manifold Assembly (Includes the Quick-Disconnect Ring)
4. Rear Tubing Manifold Assembly

The spray head(s) and valve manifold contain the fluid and air passages. All fluid passages contain stainless steel and/or nylon fittings, compatible with halogenated hydrocarbon solvents. The robot manifold incorporates stainless steel fluid connections.

SPECIFICATIONS

Environmental / Physical

Robot/Mounting
Compatibility: All hollow wrist robots

Operating Temperature
Range: 55°F (12.8°C) - 131°F (55°C)

Weight
- Dual-Head W/Manifold:
  - 60° 8.6 lbs. (3.9 Kg)
  - 90° 8.3 lbs. (3.8 Kg)
- Single-Head W/Manifold:
  - 60° 7.9 lbs. (3.6 Kg)
  - 90° 7.6 lbs. (3.5 Kg)

Length
- Dual-Head:
  - 60° 7 3/4" (19.69 cm)
  - 90° 9" (22.86 cm)
- Single-Head:
  - 60° 7 1/4" (18.42 cm)
  - 90° 8 3/4" (22.22 cm)
- Tubing Manifolds (English):
  - A11071-1XX 15' (4.57m)
  - A11071-2XX 30' (9.14m)

Paint Flow Rate: Variable to 1500 cc/min.
(Depending on viscosity & configuration)

Trigger Response
Time: 150m sec. open
220m sec. closed

Operating Air Pressures
- Atomizing Air: 100 psig max. (6.9 bar)
- Fan Air: 100 psig max. (6.9 bar)
- Trigger Air: 70 psig min./100 psig max. (4.8 - 6.9 bar)
- Regulator Pilot: 70 psig min./100 psig max. (4.8 - 6.9 bar)
- Dump Pilot: 70 psig min./100 psig max. (4.8 - 6.9 bar)
- Operating Fluid Pressure: 100 psig max. (6.9 bar)

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Specifications (Cont.)

Robot Manifold Tubing Requirements	
	Metric
Atomizing Air:	10mm OD Nylon
Fan Air:	10mm OD Nylon
Trigger Air:	4mm OD Nylon
Regulator Pilot:	4mm OD Nylon
Dump Pilot:	4mm OD Nylon
Fluid:	8mm (Non-Shielded)
Dump:	10mm

NOTES

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FEATURES

The features of the Evolver series applicators include:

- Quick disconnect spray head
- High quality Ransburg air cap and fluid nozzle
- Internal fluid regulator
- Dual start, dual pitch air cap retaining ring
- Quick disconnect robot mount plate
- Quick color change capability with integrat solvent valve
- Internal fan and atomization air control valve, with a mechanically timed trigger sequence
- Color coded air and trigger actuation lines

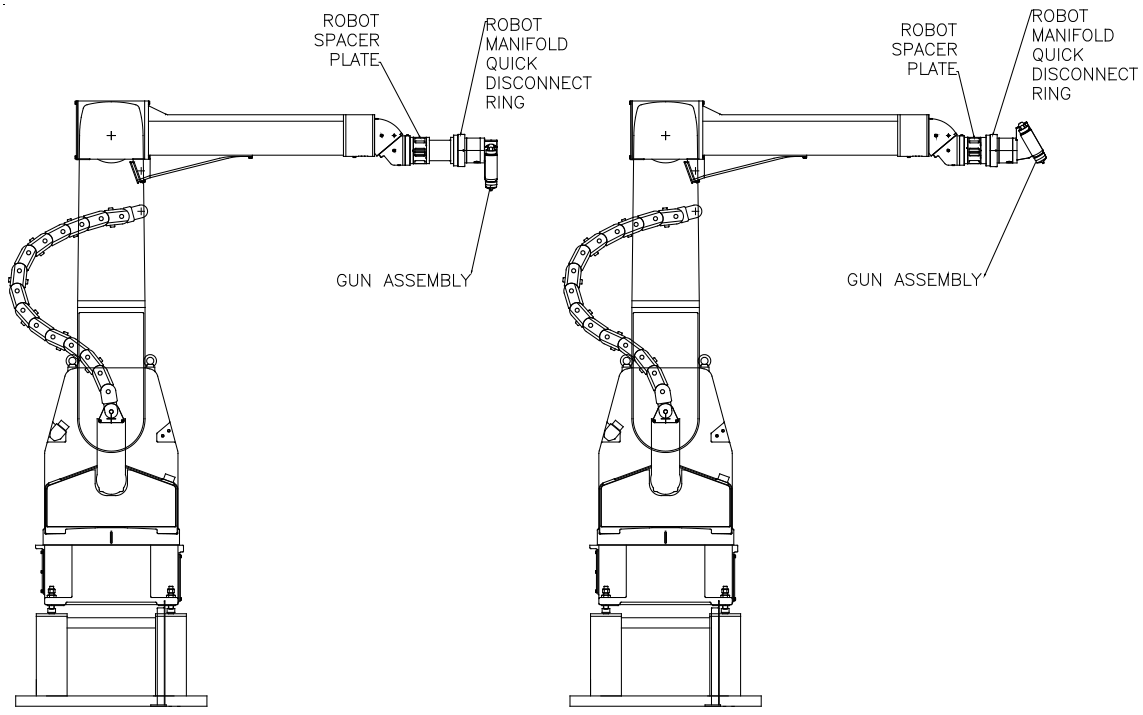

Figure 1: Typical Robotic Applicator Mounting

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EVOLVER 60° AND 90° DUAL-HEAD NE APPLICATOR SELECTION GUIDE

A11279 - AA

Basic Applicator Configuration
60° Dual-Head

Table A = Tubing Bundle
00 = Robot Adapter (Sleeve & Tubing Not Included)
01 = Adapter (FANUC); 15' Tubing Lg.
02 = Adapter (ABB); 15' Tubing Lg.
03 = Adapter (FANUC P-200); 15' Tubing Lg.
04 = Adapter (Kawaski - KE610L); 15' Tubing Lg.
05 = Adapter (Motoman - PX2850); 15' Tubing Lg.
06 = Adapter (Motoman - PX2900); 15' Tubing Lg.
07 = Adapter (B & M - LZ2000); 15' Tubing Lg.
08 = Adapter (FANUC); 30' Tubing Lg.
09 = Adapter (ABB); 30' Tubing Lg.
10 = Adapter (FANUC - P200); 30' Tubing Lg.
11 = Adapter (Kawasaki - KE610L); 30' Tubing Lg.
12 = Adapter (Motoman - PX2850); 30' Tubing Lg.
13 = Adapter (Motoman - PX2900); 30' Tubing Lg.
14 = Adapter (B & M - LZ2000); 30' Tubing Lg.

A11281 - AA

Basic Applicator Configuration
90° Dual-Head

Table A = Tubing Bundle
00 = Robot Adapter (Sleeve & Tubing Not Included)
01 = Adapter (FANUC); 15' Tubing Lg.
02 = Adapter (ABB); 15' Tubing Lg.
03 = Adapter (FANUC P-200); 15' Tubing Lg.
04 = Adapter (Kawaski - KE610L); 15' Tubing Lg.
05 = Adapter (Motoman - PX2850); 15' Tubing Lg.
06 = Adapter (Motoman - PX2900); 15' Tubing Lg.
07 = Adapter (B & M - LZ2000); 15' Tubing Lg.
08 = Adapter (FANUC); 30' Tubing Lg.
09 = Adapter (ABB); 30' Tubing Lg.
10 = Adapter (FANUC - P200); 30' Tubing Lg.
11 = Adapter (Kawasaki - KE610L); 30' Tubing Lg.
12 = Adapter (Motoman - PX2850); 30' Tubing Lg.
13 = Adapter (Motoman - PX2900); 30' Tubing Lg.
14 = Adapter (B & M - LZ2000); 30' Tubing Lg.

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EVOLVER 60° AND 90° SINGLE-HEAD NE APPLICATOR SELECTION GUIDE

A11775 - AA

Basic Applicator Configuration
60° Single-Head

Table A = Tubing Bundle
00 = Robot Adapter (Sleeve & Tubing Not Included)
01 = Adapter (FANUC); 15' Tubing Lg.
02 = Adapter (ABB); 15' Tubing Lg.
03 = Adapter (FANUC P-200); 15' Tubing Lg.
04 = Adapter (Kawaski - KE610L); 15' Tubing Lg.
05 = Adapter (Motoman - PX2850); 15' Tubing Lg.
06 = Adapter (Motoman - PX2900); 15' Tubing Lg.
07 = Adapter (B & M - LZ2000); 15' Tubing Lg.
08 = Adapter (FANUC); 30' Tubing Lg.
09 = Adapter (ABB); 30' Tubing Lg.
10 = Adapter (FANUC - P200); 30' Tubing Lg.
11 = Adapter (Kawasaki - KE610L); 30' Tubing Lg.
12 = Adapter (Motoman - PX2850); 30' Tubing Lg.
13 = Adapter (Motoman - PX2900); 30' Tubing Lg.
14 = Adapter (B & M - LZ2000); 30' Tubing Lg.

A11776 - AA

Basic Applicator Configuration
90° Single-Head

Table A = Tubing Bundle
00 = Robot Adapter (Sleeve & Tubing Not Included)
01 = Adapter (FANUC); 15' Tubing Lg.
02 = Adapter (ABB); 15' Tubing Lg.
03 = Adapter (FANUC P-200); 15' Tubing Lg.
04 = Adapter (Kawaski - KE610L); 15' Tubing Lg.
05 = Adapter (Motoman - PX2850); 15' Tubing Lg.
06 = Adapter (Motoman - PX2900); 15' Tubing Lg.
07 = Adapter (B & M - LZ2000); 15' Tubing Lg.
08 = Adapter (FANUC); 30' Tubing Lg.
09 = Adapter (ABB); 30' Tubing Lg.
10 = Adapter (FANUC - P200); 30' Tubing Lg.
11 = Adapter (Kawasaki - KE610L); 30' Tubing Lg.
12 = Adapter (Motoman - PX2850); 30' Tubing Lg.
13 = Adapter (Motoman - PX2900); 30' Tubing Lg.
14 = Adapter (B & M - LZ2000); 30' Tubing Lg.

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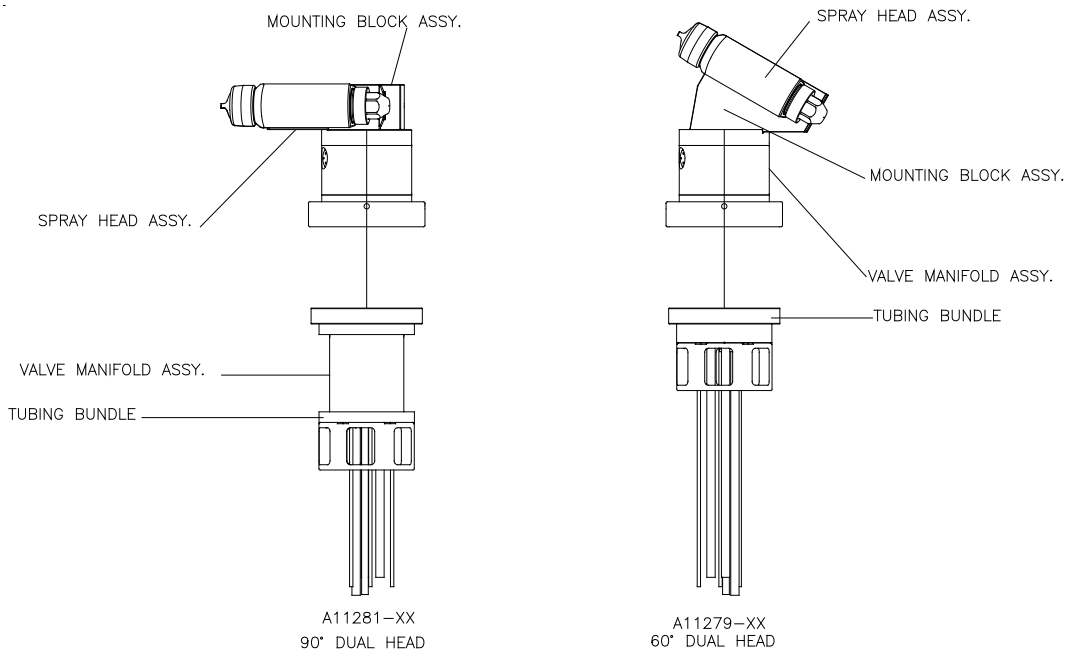

Figure 2A: A11281-XX and A11279-XX Evolver Dual-Head NE Solventborne Robotic Atomizer Applicators

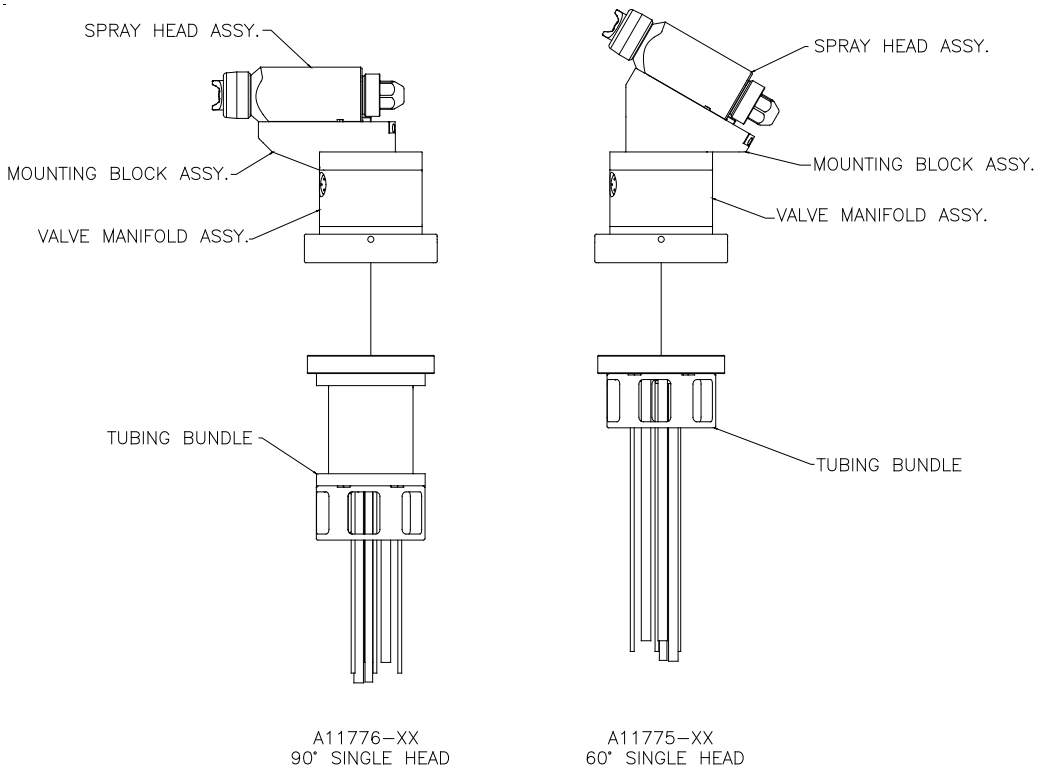

Figure 2B: A11776-XX and A11775-XX Evolver Single-Head NE Solventborne Robotic Atomizer Applicators

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NOTES

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A11281-XX, A11279-XX, A11776-XX, AND A11775-XX EVOLVER NE APPLICATOR ASSEMBLIES

The applicator assembly is designed to connect to the hollow wrist robots.

Tool Center-Point

Figures 3a and 3b shows the tool center-point information.

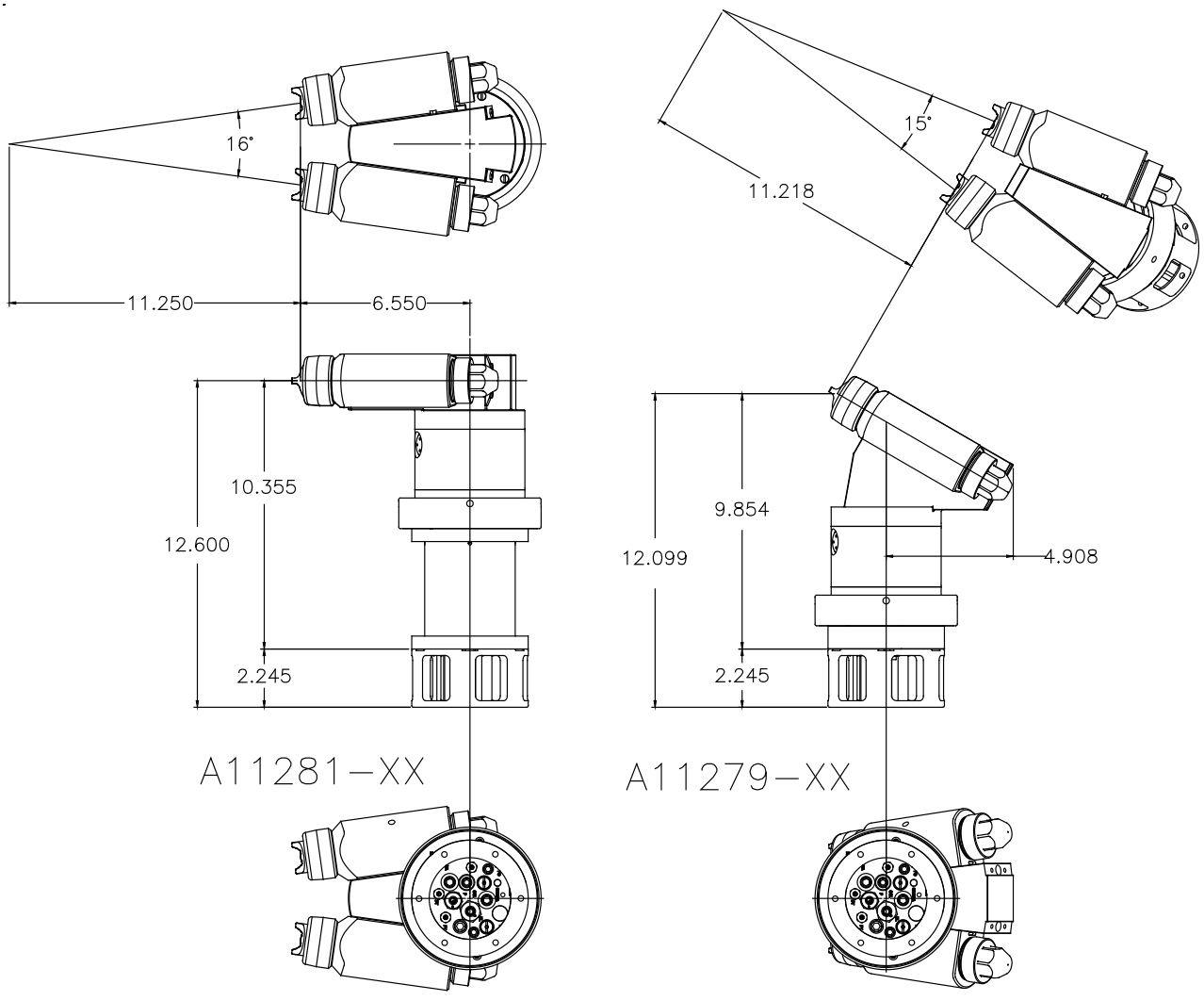

Figure 3a: A11281-XX and A11279-XX Tool Center-Point

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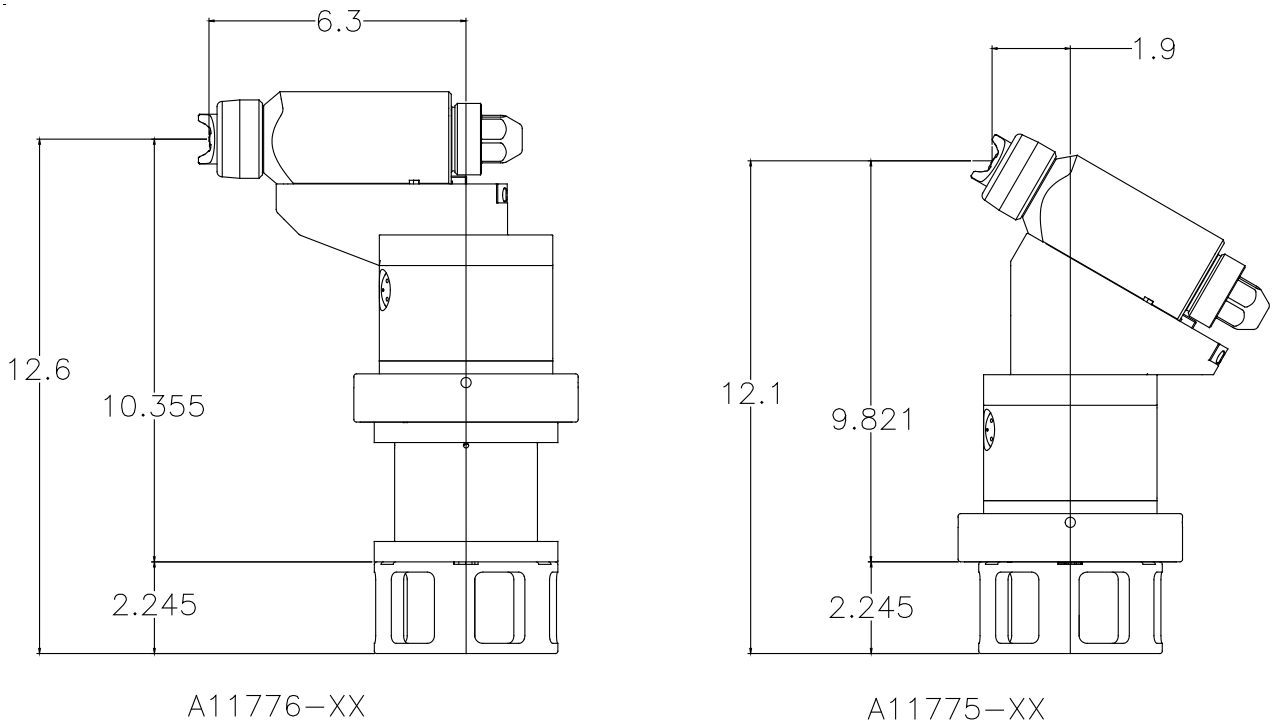

Figure 3b: A11776-XX and A11775-XX Tool Center-Point

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INSTALLATION

EVOLVER NE ROBOTIC ATOMIZIER INSTALLATION

This information is intended ONLY to indicate the general installation parameters of this product and, where applicable, its working relationship to other Ransburg system components in typical use. Each installation is unique and should be directed by an authorized Ransburg representative or conducted from the Ransburg installation drawings provided for your particular installation.

APPLICATOR AND MANIFOLD ASSEMBLY
(See Figure 2)

The tubing and hose come bundled from the factory. Pull the bundle through the robot spacer plate and robot wrist carefully to prevent any cuts on the cable or hoses. Use the six (6) socket head cap screws (7959-32C) included with the rear manifold tubing assembly to attach the rear manifold assembly (A11071-XX) to the robot spacer plate (see Table 1).

Connect each signal line as required per signal identification, table following.

Robot Spacer Plate

The robot spacer plate is included with the robot manifold assembly to increase life of the tubing bundle. The extra spacing it provides, increases the bend radius of the tubes and decreases the hose or cable stress at the connector.

There is only one way the spacer plate may be assembled to the mounting plate. The spacer plate has an alignment pin that may only engage in one hole position in the robot mount plate. This provides the final position to top head center of the robot.

The six (6) robot spacer plates are available for this product (see Table 1).

TABLE 1 - SPACER PLATES

Part #	Description
79107-00	ABB Robots
78983-00	Fanuc P155, 145 Robots
79131-00	Fanuc P200 Robot
A10847-00	Adapter (Kawasaki-KE610L)
A10848-00	Adapter (Motoman-PX2850)
A10849-00	Adapter (Motoman-PX2900)
A10851-00	Adapter (B & M-LZ2000)

CAUTION

> Leave 12-24 inches of extra length on all lines to prevent extreme tension being applied to these lines during robot movement.

WARNING

> Install and route the hoses so that they are NOT exposed to temperatures in excess of 120° F. Ensure that all hose and cable bends are NOT LESS THAN a 6 inch (15 cm) radius and are not subjected to more than 360° of torsional twist. Failure to comply with these parameters could cause equipment malfunctions that might create HAZARDOUS CONDITIONS!

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SIGNAL IDENTIFICATION TABLE					
Abbr.	Description	Color	Tubing Material	Tubing Size	Item #
DT	Dump Trigger	Silver	Nylon	4mm OD X .106 ID	5
PT	Paint Trigger	Green	Nylon	4mm OD X .106 ID	6
ST/RP	Regulator Pilot	Blue	Nylon	4mm OD X .106 ID	7
BA	Plugged	----	----	----	23
TA/FA	Fan Air	Blue	Nylon	10mm OD X 8mm ID	25
SAO/AA	Atom Air	Gray	Nylon	10mm OD X 8mm ID	21
BRK	Plugged	----	----	----	23
SAI	Plugged	----	----	----	24
SOL	Plugged	----	----	----	23
FO	Plugged	----	----	----	20
LV	Plugged	----	----	----	19
DL	Dump	Natural		10mm OD X 8mm ID	12
P	Paint	Natural		8mm OD X 6mm ID	13

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OPERATION

SPRAY APPLICATOR CONTROLS

Atomization (A) / Fan Air (F)

The atomization and fan air are turned on by the trigger line and are controlled by an internal air valve located in the applicator head. During normal operation with applicator triggered off, there is a slight bleed of air through the atomization part.

Atomizing Air

Adjustments are made through the robot PLC or a manually adjustable air regulator. The lowest air pressure required to break up the paint should be used. Lower atomizing air pressures result in less overspray and increased transfer efficiency.

Fan Air

Adjusting the fan air increases or decreases the size of the spray pattern. Increasing pressure increases pattern size. Pattern adjustment should be made to suit the size and shape of the object being painted. This adjustment is made through the robot PLC or a manually adjustable air regulator.

Air cap pressures should be set using air cap test kit. This provides a consistent measurement, so initial settings may be duplicated at any time. (See "Parts Identification" section for "Air Cap Test Kit Part Numbers".)

NOTE

> Insure that the fan and atomization air are on and flowing prior to triggering the fluid. Failure to follow this sequence will cause spits and defects on the part being painted.

FLUID VALVE CONTROLS

Trigger, Dump, and Solvent (See Figure 4)

The fluid dump valve in the Evolver NE is actuated by an air signal. The air pressure must exceed 70 psi (4.83 Bar) to assure proper actuation of the valve. Applying air to the valve actuator turns on the fluid flow for that valve.

The dump valve controls the paint flow through the dump line. When actuated, paint flow is direct to the dump return line. This provides a method of rapidly removing paint from the incoming line for cleaning and/or color change. Normally, the dump valve is not actuated at the same time as the paint trigger since the trigger is intended to cause the fluid to flow out the applicator at the prescribed input pressure.

DUAL PURGE SPRAYING

Paint Viscosity

The applicator is capable of atomizing paint of most any desired viscosity. It is recommended to keep the material viscosity as low as possible. This allows spraying at lower fan and atomization air pressures which results in less overspray and higher transfer efficiency.

⚠ WARNING

> Most paints and solvents are toxic to a certain degree and flammable or combustible. Use them only in a well ventilated atmosphere. Use protective equipment as required in the Material Safety Data Sheet supplied with the substance.

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Fluid Flow Rate

Fluid flow is adjusted through the robot PLC by varying the pilot pressure to the on-board fluid regulator within the spray applicator. Fluid pressures from the circulating system may exceed the maximum fluid pressure rating of the Evolver applicator. Because of these high fluid pressures, a manual step-down fluid regulator must be used.

Trigger Control Air

The Evolver applicators require a minimum of 70 psig trigger control air pressure to ensure proper operation of the applicator piston.

Target Distance

The distance between the applicator tip and the article being painted should be between 10-14 inches. Excessive distance causes a waste of coating material.

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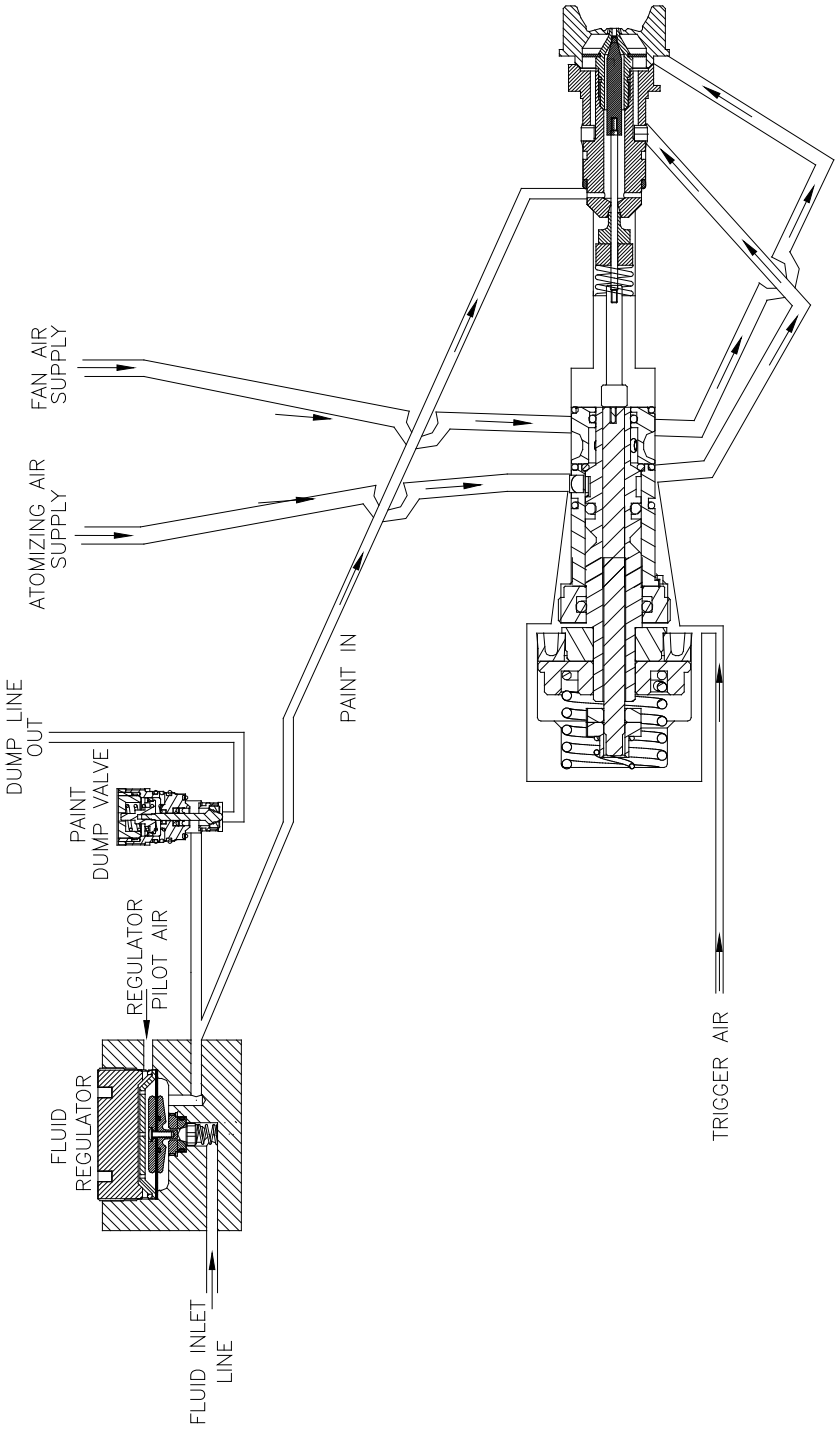

Figure 4: Simplified Air and Fluid Flow Passage Layout

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MAINTENANCE

Good maintenance is essential to safe and productive operation. Schedules should be established by the user, based on the following general information and observations of the initial production requirements. The Ransburg maintenance and safety information should be made available to each operator.

Normal fire protection measures are necessary, including proper storage of paints and solvents and the proper disposal of waste. Ready access to appropriate fire extinguishing equipment is required. For details, consult the appropriate NFPA safety information, your local fire codes, local painting equipment standards, OSHA requirements, as well as your insurance carrier's information.

⚠ WARNING

> Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA.

> Solvents used for equipment flushing must have flash point ratings equal to or greater than the flash point rating of the coating material. Solvents used for general cleaning must have flash point ratings higher than 100°F (37.8°C).

> Never remove spray applicator head from assembly while under pressure.

ROUTINE MAINTENANCE SCHEDULE

Follow these maintenance steps to extend the life of the applicator and ensure efficient operation:

Several Times Daily

1. Inspect the fluid nozzle and electrode wire for paint accumulation. Clean as frequently as necessary. (See "Procedures" in the "Mainte-nance" section.)

Daily (Or at Shift Start)

1. Inspect workholders for accumulated coating materials (remove such accumulations if present).

2. Check that the nozzle assembly is clean and undamaged.

Shut-Down (Or at Shift End)

1. Flush the lines and allow the solvent to remain in the lines. See "Procedures" in the "Maintenance" section.

2. Wipe the applicator and robot wrist with a cloth and a suitable, clean non-polar solvent.

Weekly

1. Check the entire system for damage, leaks and paint accumulation.

2. Clean the atomizer assembly.

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PROCEDURES

Applicator Cleaning/Service (See Figure 5)

1. Flush the paint supply line and the applicator paint passages using a solvent which is compatible with the material being sprayed. Continue to flush until all traces of paint are gone.

2. Turn off the solvent supply, actuate paint push-out air at color changer and trigger the applicator. Allow all of the fluid to drain from the spray applicator fluid passages.

3. Clean the exterior surfaces of the spray applicator with a solvent soaked rag.

4. Remove end cap [1]. Removing the end cap releases tension on all internal spray head components. Remove needle spring [2] and valve spring [3], which are loose after removing the piston cap.

CAUTION

> Never attempt to clean the air cap holes with a wire or other metal object. Doing so may damage the air cap, resulting in distortion of the spray pattern.

5. Remove the air cap retainer [36] and air cap [35]. Soak in a solvent if necessary. If paint remains in the air cap holes, clean with a toothpick or similar soft wood object. Air caps are best cleaned in an ultrasonic cleaner.

6. Remove the air cap locator [33] and fluid tip [34]. Clean using a solvent.

7. Tightly grip the plastic needle [6] and unscrew counter-clockwise to remove the front needle tip. A short piece of H-2339 tubing (1/4" OD x 0.175" ID) pressed over the front needle will assist in unscrewing the assembly. If required, use needle nose pliers with masking tape or duct tape. Carefully clean with a solvent. Replace any parts that show signs of wear or damage.

CAUTION

> If using needle nose pliers to unscrew the front needle, be very careful. Do not grip on the tapered sealing surface. If the pliers slip, they could damage the tapered sealing surface of the needle.

8. Remove fluid nozzle [32] by unscrewing counter-clockwise. Inspect o-ring [30] and all passages for build-up or damage. Clean or replace as necessary. Lubricate and reinsert o-ring into applicator barrel and reinstall fluid nozzle. Torque fluid nozzle to 25 lbs•in (2.82 Nm).

NOTE

> There should be a small gap between the fluid nozzle and the applicator barrel after tightening.

WARNING

> DO NOT use the A11218-00 tip assembly [31] with electrostatic voltage. The electrode tip is for non-electrostatic applications ONLY.

9. After cleaning, insert the front needle tip [31] back into the spray head assembly. Apply Loctite #222, low strength (purple) thread-locker, to the threads of the tip assembly before reassembly.

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NOTE

> The fluid tip [34] should always be installed and tightened before installing the needle and valve springs.

10. Screw fluid tip [34] back into place. Hand tighten first, then with a small wrench, tighten an additional 30°.

CAUTION

> After tightening the fluid tip, always check to see if the proper gap of 1/16" (1.59mm) between the needle nuts and air valve stem occur, before installing the needle and valve springs back into the head.

11. Replace air cap locator [33], air cap [35], and air cap retainer [36].

12. Apply a thin film of petroleum jelly to valve and needle springs [2] and [3]. Install the springs back into the end cap and the spray head assembly.

13. Screw end cap [1] back on.

The spray head can be removed from assembly as shown in Figure 5 for cleaning and service.

NOTES

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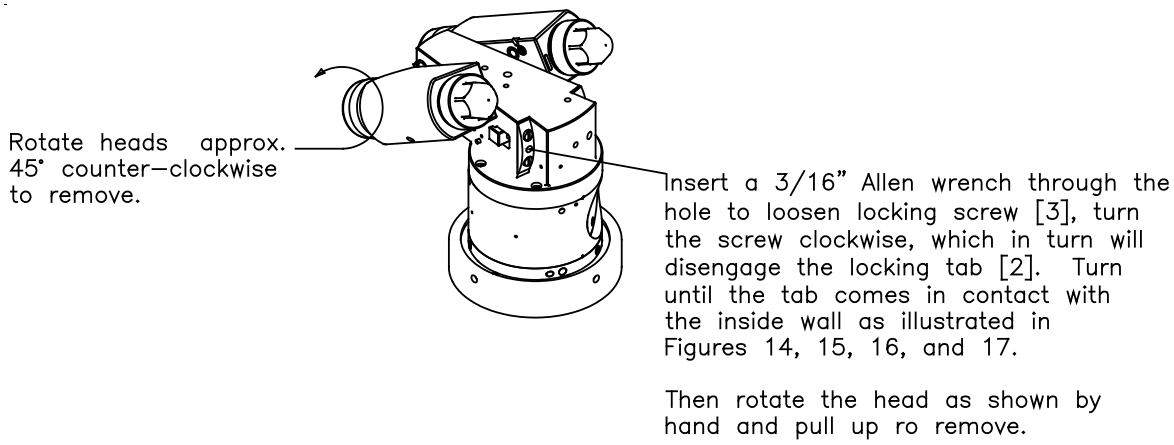
Rotate heads approx. 45° counter–clockwise to remove.
Insert a 3/16" Allen wrench through the hole to loosen locking screw [3], turn the screw clockwise, which in turn will disengage the locking tab [2]. Turn until the tab comes in contact with the inside wall as illustrated in Figures 14, 15, 16, and 17.
Then rotate the head as shown by hand and pull up ro remove.

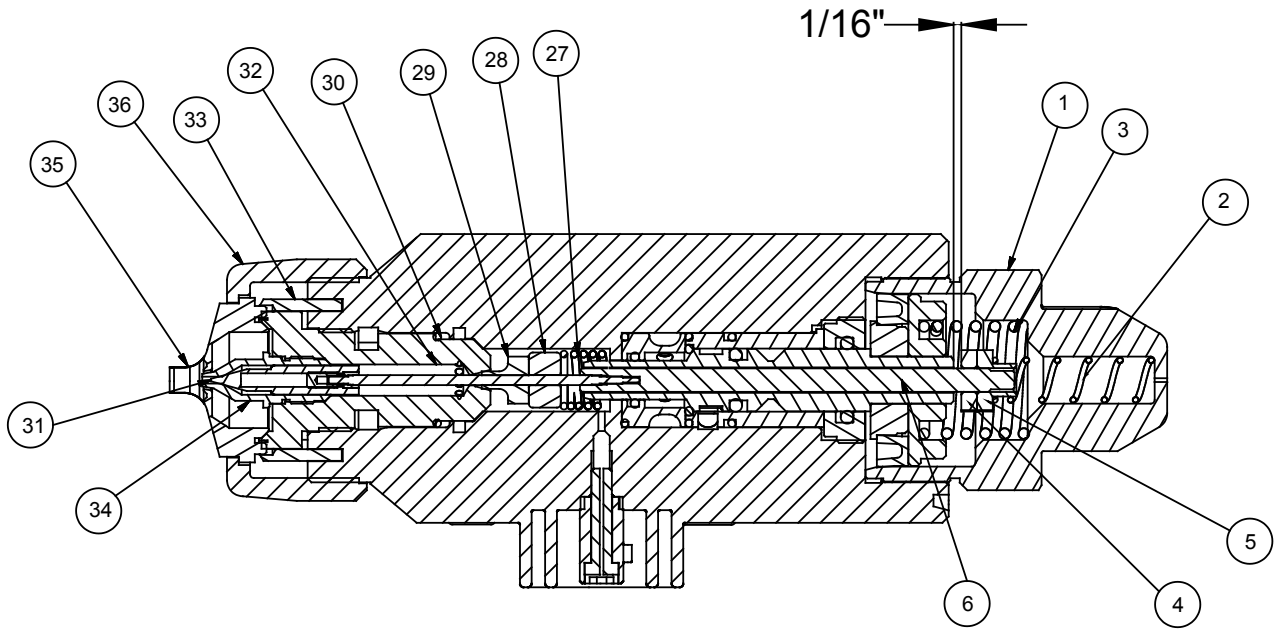

Figure 5: Spray Head Removal Assembly

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SPRAY HEAD REMOVAL ASSEMBLY - PARTS LIST (Figure 5)			
Item #	Part #	Description	Qty
1	79148-00	End Cap, Spray Head	1
2	17615-00	Spring, Compression	1
3	9334-00	Spring, Valve Return	1
4	7733-07	Jam Nut	1
5	76199-00	Rear Adjusting Nut	1
6	79151-00	Assembly, Needle Shaft	1
27	RME-38	Return Spring, Piston	1
28	EMF-7	Seal, Washer	1
29	RME-32	Seal	1
30	79001-01	O-Ring, Solvent Proof	1
31	A11218-00	Needle, Front	1
32	EMF-195	Nozzle, Fluid Hole	1
33	EMF-192	Locator, Air Cap	1
34	79140-02	Fluid Tip, .055" (1.4mm) Diameter	1
35	79153-65R-1	Air Cap, Pinned	1
36	79154-00	Retaining Ring, Tapered	1

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SERVICE

Because we want to provide our users with the most up-to-date technology possible, we are constantly seeking to improve products. If a change in product configuration occurs after it is on the market, we will implement that technology in future production and, if practical, make it available to current users. The following service information is based on standard specifications and procedures for this product. If you find some minor deviations between this information and your equipment because of design or manufacturing changes, contact your Ransburg representative to resolve the difference.

WARNING

> Unexpected robot movement can be hazardous. Do not adjust or repair the spray applicator when the robot is operating or waiting to start. The robot must be locked out and tagged out per OSHA. prior to removing the applicator from the robot manifold assembly.

Before performing any work on the spray applicator, always flush the fluid passages and blow dry with push-out air, and wipe the spray applicator clean. Refer to "Gun Cleaning/Service" in the "Maintenance" section, for instructions on how to properly clean the spray applicator. Depressurize all fluid and air pressures before removing the applicator from its manifold. Always work in a clear, clean space to minimize parts loss and damage.

CAUTION

> As the spray head is removed from the valve manifold assembly, a certain amount of residual fluid may be present. Care must be taken not to allow this fluid to drain into the high voltage terminal rings or air passages.

WARNING

> Eye protection should be worn while servicing gun.

SPRAY HEAD ASSEMBLY

NOTE

> Disassemble spray head only enough to remove and replace defective parts. For instance, if only replacing the front electrode it is not necessary to remove the fluid nozzle.

NOTE

> To prevent damage, always lubricate the o-rings located on the underside of the spray head.

Rear Needle Replacement (See Figure 5)

1. Remove the air cap, fluid tip, and the fluid nozzle as described in Steps 1 through 13 of the "Gun Cleaning/Service"" in the "Maintenance" section.

2. Remove the rear needle [6] and lock nuts [4] and [5] as an assembly. Pull the assembly out from the rear of the spray head.

CAUTION

> Fluid seal [29], seal washer [28], and seal spring [27], will come free at this point. Place hand over end as not to drop parts.

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3. Inspect metal portion of the rear needle [6] for excessive wear. If wear is observed (longitudinal grooves or a noticeable reduction in diameter), replace the needle. Remove the two (2) lock nuts from the rear needle and save. When ever replacing rear needle section, you must also replace the seal [29] at the same time.

4. Place the rear needle assembly back into the spray head.

5. Place seal spring [27] over the rear needle in the front end of the spray head. Hold the spray head upward as the spring will want to fall out.

6. Still holding the spray head upward, place the seal washer [28] and thread the fluid seal [29] onto the rear needle. The tapered end of the fluid seal should be pointed toward the front of the applicator.

7. Insert the lubricated o-ring [30] into the applicator head. Gently push, with small flat object, down upon its seating edge. Be careful not to push o-rings into fluid groove (see Figure 5).

8. Reassemble fluid nozzle [32] by pushing the nozzle into the spray head and through the o-ring until the threads engage. Screw the nozzle into the spray head. Torque to 23-25 lbs•in (2.6 - 2.8 Nm). Plastic threads damage easily; do not overtighten. Note the front flange of the fluid nozzle will not seat flush against the spray head.

9. Apply Loctite #222 Low Strength (purple) Threadlocker into the threads of plastic front needle [31] before assembling onto the rear needle. Be sure that the rear needle assembly is pushed all the way forward before threading on front needle.

10. Reassemble fluid tip [34]. Hand tighten first, then with a small wrench turn an additional 30 degrees.

11. Reinstall the two (2) lock nuts [4] and [5] in the correct order on the back needle as shown making sure to maintain an 1/16" clearance (see Figure 5).

12. Reassemble air cap [35] and air cap retainer [33]. The air cap rotate positioning pins must be engaged with the air cap locator holes before final tightning.

13. Apply a thin film of petroleum jelly to valve spring [3] and needle spring [2], and insert back into the end cap. Screw end cap [1] back on.

14. Lubricate all of the o-rings on the underside of the spray head with petroleum jelly, and apply a thin coat of dielectric grease to the grooves of the spray head and the valve manifold before reassembly.

15. Reattach spray head to manifold block by engaging the connection plug [24] into the mount-ing block cavity [3], and turn clockwise until head contacts stop pin on the block.

Air Valve Removal
(See Figure 6)

1. After removal of end cap and spring, the air valve can be pulled straight out the back of the head assembly.

2. Inspect and replace the u-cup [8], if neces- sary, by holding the air valve shaft on it's flats and loosening the piston nut [7] counter-clockwise.

3. Remove the seal carrier with seal removal tool [B].

4. Use a bent hook to reach inside the air valve bushing [14], grip slot and pull out. Use the same procedure to pull out the rear seal carrier [17].

CAUTION

> Use caution as NOT TO scratch or raise burrs on inside diameters of the parts.

5. Remove and replace all o-rings if necessary.

6. O-rings [12] and [18] must be installed inside their mating parts (see Figure 6).

7. The o-ring [16] should be inserted into the front of the bushing [14] and one of the o-rings [15] installed onto the outside groove before the bushing is installed.

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8. Reassemble the remaining parts as shown in Figure 6 making sure that the alignment tab on the bushing [14] lines up with the align groove in the body [19].

9. Torque the seal carriage [13] to 35-40 lbs•in (4.0-4.5 Nm).

10. If the u-cup needs to be replaced, assemble on piston plate [9] and push both onto shaft, tighten securely with piston nut [7] and install in body as one assembly.

11. Assemble the remainder of the applicator head as stated earlier.

12. If the locking tab plug connection [24] needs to be replaced, remove socket head screw [22] and connection plug [24] from body.

13. Reinstall the connection plug [24] into the body, making sure the tabs on the bottom align with the notches in the body [19].

14. Insert and tighten the screw [22], making sure the tabs remain inside the notches [24] in the body.

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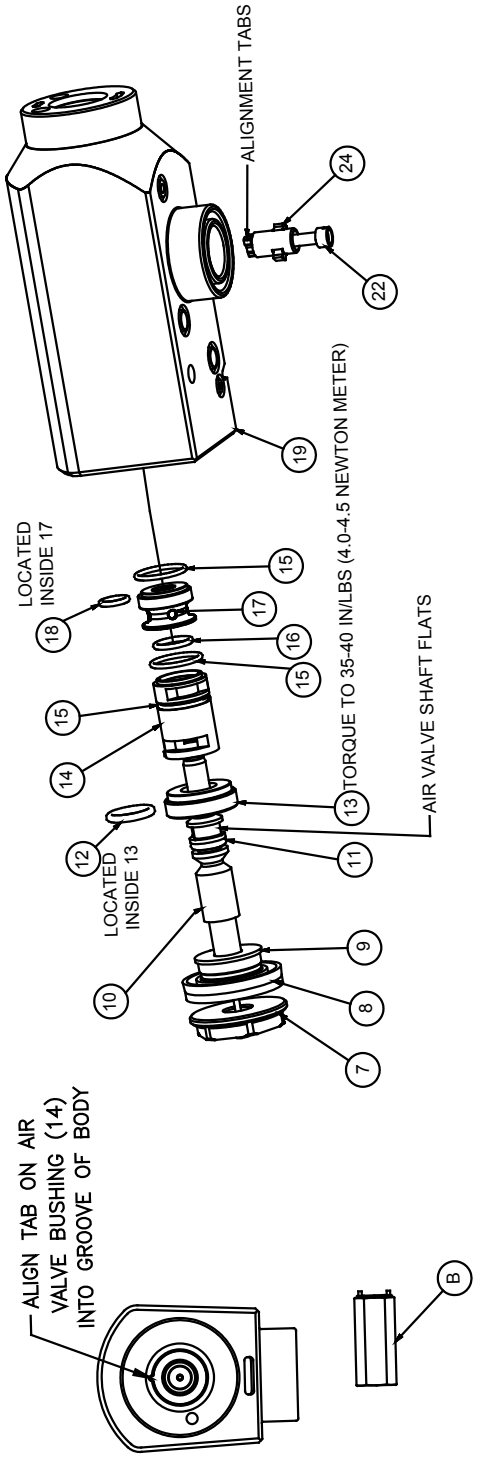

Figure 6: 79138-03 Evolver Applicator Head Assembly

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79138-03 EVOLVER APPLICATOR HEAD ASSEMBLY - PARTS LIST (Figure 6)			
Item #	Part #	Description	Qty
7	79147-00	Nut, Piston	1
8	7723-06	Piston, U-Cup	1
9	79145-00	Plate, Piston	1
10	79144-00	Shaft, Air Valve	1
11	76630-109	O-Ring, Solvent Proof	1
12	76630-112	O-Ring, Solvent Proof	1
13	79146-00	Seal Carrier, Rear Piston	1
14	79143-00	Bushing, Air Valve	1
15	79001-01	O-Ring, Solvent Proof	3
16	13076-13	O-Ring	1
17	79172-00	Carrier, Rear Seal	1
18	79001-06	O-Ring, Solvent Proof	1
19	79137-00	Head, Machining	1
22	79142-00	Screw, SHCS, 8-32 X .75" Long	1
24	79141-00	Plug, Connection	1

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REMOVING APPLICATOR FROM THE REAR MANIFOLD ASSEMBLY

(See Figure 7)

Anytime service is required, the applicator must be removed from the tubing manifold assembly. After the applicator is removed from the robot, always move to a clear, clean work area to remove the applicator shroud and begin servicing.

1. Purge all fluid from the system and blow lines dry with pushout air before the applicator is removed.

2. All pressures must be removed, both air and fluid, before removing the applicator. Fluid pressure can be removed by actuating the applicator trigger with the fluid regulator open.

3. Remove applicator from robot by turning the retaining ring counter-clockwise from the manifold robot mounting plate.

4. Remove spray head [1] as described previously.

Disassembly

5. Remove four (4) screws [11] from dual mounting block. Set block aside.

6. Remove and inspect the o-rings [12], [13], and [14]. Replace if necessary.

7. Remove retaining ring [10] by pulling straight up.

8. Remove the five (5) break-away screws from ring and set aside.

9. Remove the three (3) screws [16] and the two (2) bolts [9] from the bottom of the valve body [5]. Inspect the five (5) o-rings [6,7] together with the two (2) o-rings [7] located within the screws [9] and replace if necessary. Reassemble in reverse order.

10. To remove the dump valve use the valve removal tool [B], remove the valve assembly [2] by turning counter-clockwise. Use tool [A] to remove the seat [1]. When replacing parts lubricate o-rings. Torque both the valve and seat to 15-20 lbs•in (1.7 - 2.0 Nm).

FLUID REGULATOR

1. To disassemble the fluid regulator, first remove the regulator cap [13] using tool [C]. Turn counter-clockwise.

2. Remove the six (6) screws [15].

3. Remove diaphragm assembly [8, 9, 10, 11, and 14] and inspect it for wear or damage. Pay particular attention to the air side, since it can be damaged by solvent contact. Replace if necessary.

> **NOTE**
>
> Once the regulator bonnet [12] is removed, diaphragm [10] will be loose and may fall out.

4. Use a 3/16" Allen wrench to unscrew the poppet seat retainer [5]. The tungsten carbide seat and needle may pop out because of the spring force applied against them.

5. Inspect the needle and seat assembly [5] for wear. If wear or damage is evident, replace. Replace both needle and seat at the same time because they are a matched set. Inspect o-ring [7] for damage, replace as necessary.

6. Reassemble the fluid regulator by inserting the spring [4], needle and seat [5], and o-ring [7] back into the regulator block assembly. Be sure to lube o-ring. Secure the needle/seat assembly by screwing the seat retainer [5] into the regulator block assembly until a torque of 8-10 lbs•in (0.9-1.1 Nm) is obtained.

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NOTE

> When replacing the needle seat, be cautious so that the plastic threads are not stripped by cross threading.

7. When placing the diaphragm [10], remove the screw [14] that holds both halves together. Inspect o-ring [9] for damage. To reassemble, make sure that the side is toward the lower support [8]. Reinstall screw and tighten. Be careful not to over tighten. If the diaphragm is inserted wrong, damage will occur. Push the diaphragm assembly down in valve body aligning the screw holes.

8. Tighten regulator bonnet [12] into the block assembly [3] securely with the six (6) screws [15] in an alternating 180° method, torque to 8-10 lbs•in (0.9-1.1 Nm).

9. Reinstall the regulator cap [13] and o-ring [6]. Torque to 125-135 lbs•in (14.1-15.3 Nm).

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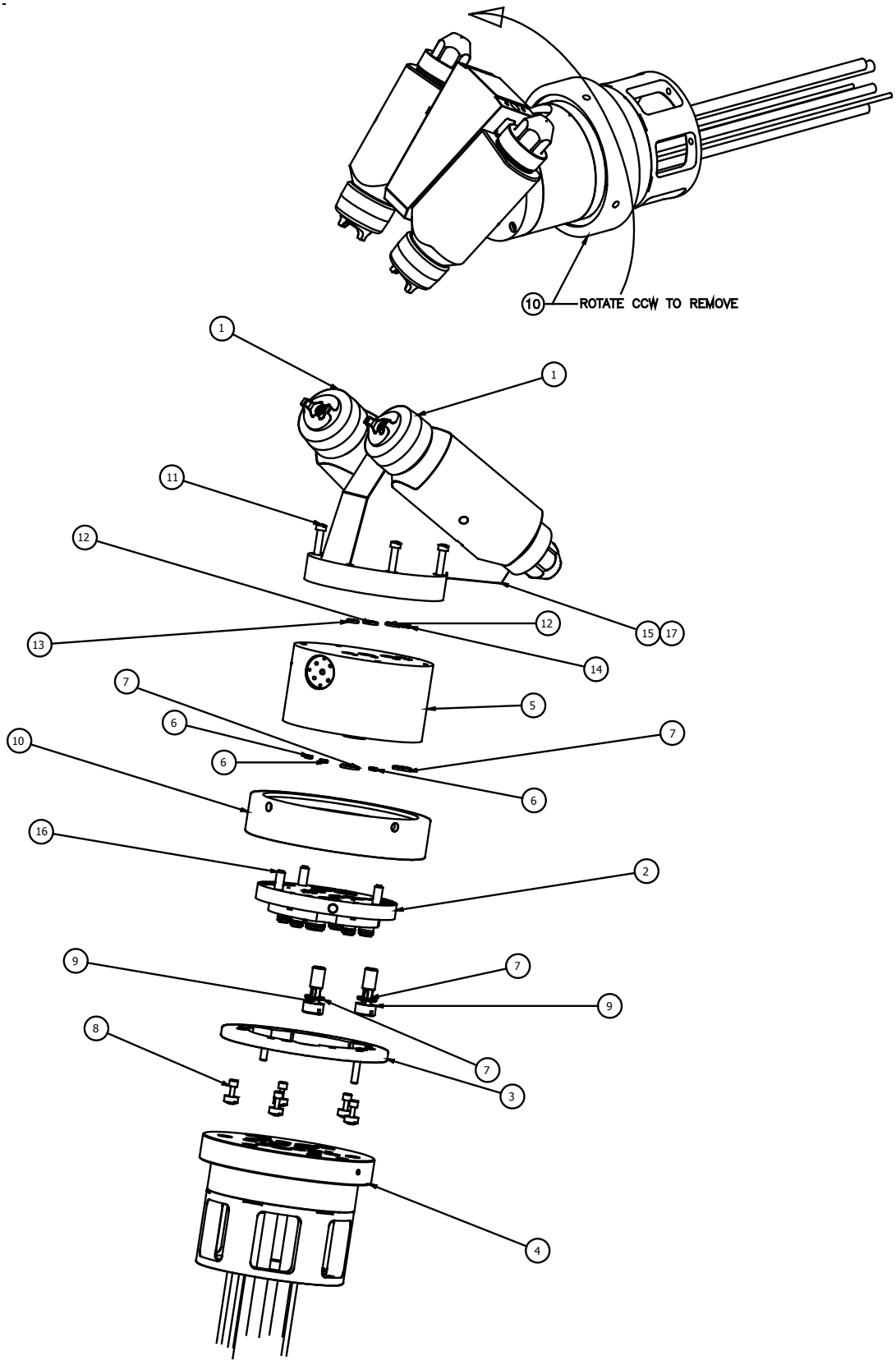

Figure 7: Applicator Disassembly and Removal

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APPLICATOR DISASSEMBLY AND REMOVAL - PARTS LIST (Figure 7)

Item #	Part #	Description	Qty
1	79138-03	Assembly, Head, Evolver NE	2
2	A11206-00	Assembly, Applicator Rear Plate	1
3	A11203-00	Assembly, Break-Away Ring	1
4	A11071-00	Assembly, Tubing Bundle, Evolver NE	1
5	A11280-00	Assembly, Valve Block, Evolver NE	1
6	79001-38	O-Ring, Solvent Proof	3
7	79001-07	O-Ring, Solvent Proof	4
8	77524-00	Screw, Break-Away	5
9	77508-00	Bolt, Air	2
10	A11201-00	Ring, Quick Disconnect	1
11	LSFA0015-00	Screw, #10-32 X 1" Lg., Filister G-10	4
12	79001-06	O-Ring, Solvent Proof	2
13	79001-13	O-Ring, Solvent Proof	1
14	79001-04	O-Ring, Solvent Proof	1
15	A11278-00	Assembly, 60° Dual Block	1
16	7959-24C	Screw, 1/4-20 X 3/4" Lg.	3
17	A11280-00	Assembly, 90° Dual Block	1

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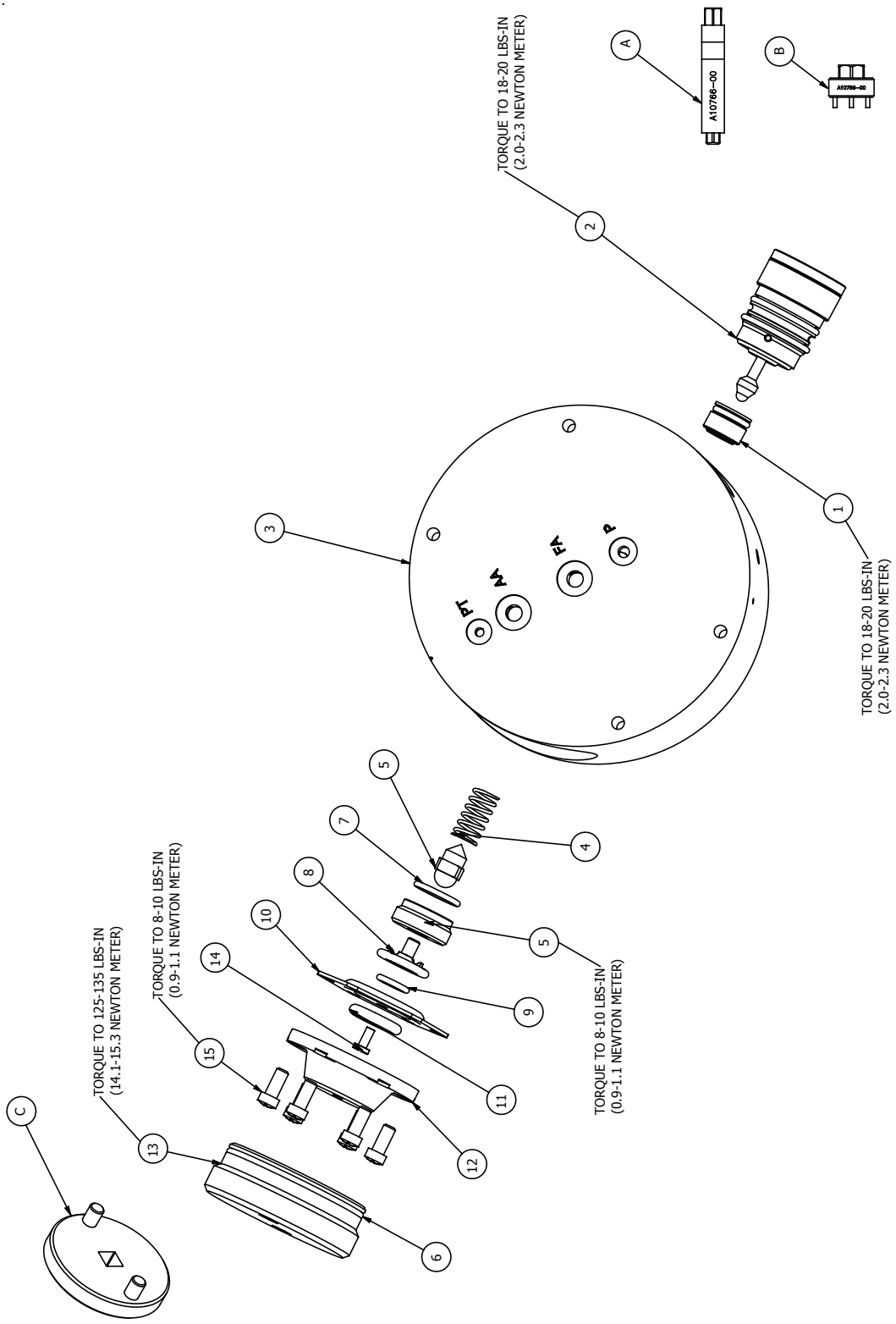

Figure 8: Valve and Regulator Manifold Disassembly

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VALVE AND REGULATOR MANIFOLD DISASSEMBLY - PARTS LIST (Figure 8)

Item #	Part #	Description	Qty
1	77367-00	Valve Seat Assembly	1
2	78949-00	Fluid Valve Assembly	1
3	A11221-00	Block, Manifold Evolver NE	1
4	74161-00	Spring, Regulator	1
5	77354-00	Assembly, Needle Seat	1
6	79001-35	O-Ring, Solvent Proof	1
7	79001-08	O-Ring, Solvent Proof	1
8	79221-00	Lower Plate, Regulator	1
9	79001-06	O-Ring, Solvent Proof	1
10	79220-00	Diaphragm	1
11	79222-00	Upper Plate, Regulator	1
12	A10741-00	Bonnet, Regulator	1
13	A10740-00	Cap, Regulator	1
14	76374-08C	Screw	1
15	A10746-00	Screw, Retaining 10-32 X 1.50"	6
A	A10766-00	Valve Seat Removal Tool	1
B	A10756-00	Valve Removal Tool	1
C	A10742-00	Regulator Cap Tool	1

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TROUBLESHOOTING GUIDE

General Problem	Possible Causes	Corrective Action
Fluid Does Not Turn On	1. Trigger pilot regulator has not been set to a minimum of 70 psig. 2. The green air tube possibly left disconnected during reassembly. 3. Green tube leading from the source to the applicator mounting plate is pinched or broken. 4. Piston seal within the applicator spray head is not in place or there is an extremely tight fit between the seal and the cylinder wall.	1. Increase to 70 psig minimum. 2. Reconnect tubing 3. Check the tubing for kinks or damage. Replace if worn or damaged. 4a. Make sure that the seal is in the proper position and/or lubricate with a small amount of petroleum jelly. 4b. O-ring missing between turbine bundle block and manifold. 4c. O-ring missing between mounting block and replaceable head.
No Fan or Atomization Air Pressure At the Air Cap	1. Low trigger pilot air pressure (70 psi min. required). 2. Green or gray 10mm OD tube is cut or pinched.	1. Increase pressure 2. Examine, repair as required.

NOTE: A test station to bench test the applicator off-line will speed the Troubleshooting process.

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PARTS IDENTIFICATION

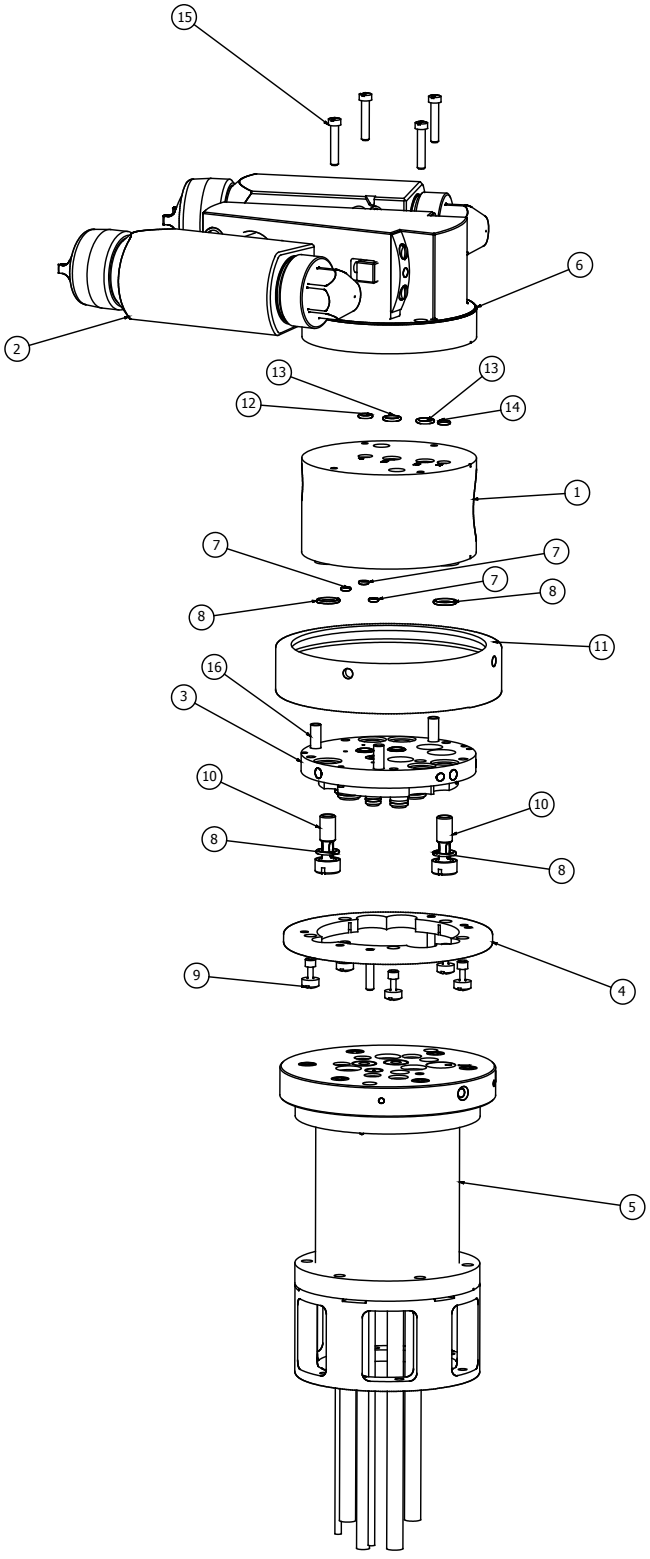

Figure 9: A11281-XX 90° Dual-Head Applicator Assembly

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A11281-XX 90° DUAL-HEAD APPLICATOR ASSEMBLY - PARTS LIST (Figure 9)

Item #	Part #	Description	Qty
1	A11282-00	Assembly, Valve Block, Evolver NE	1
2	79138-03	Assembly, Head Robot Applicator	2
3	A11206-00	Assembly, Applicator Rear Plate	1
4	A11203-00	Assembly, Break-Away Ring	1
5	See Table A - "B"	Assembly, Tubing Bundle, Evolver NE	1
6	A11280-00	Assembly, 90° Dual Block	1
7	79001-38	O-Ring, Solvent Proof	3
8	79001-07	O-Ring, Solvent Proof	4
9	77524-00	Screw, Break-Away	5
10	77508-00	Bolt, Air	2
11	A11201-00	Ring, Quick Disconnect	1
12	79001-13	O-Ring, Solvent Proof	1
13	79001-06	O-Ring, Solvent Proof	2
14	79001-04	O-Ring, Solvent Proof	1
15	LSF0015-00	Screw, #10-32 X 1" Lg., Filister G-10	4
16	7959-24C	Screw, 1/4-20 X 3/4" Lg., HCS	3

TABLE A - TUBING BUNDLE 90° DUAL-HEAD ASSEMBLY

Dash No.	Description	"B"
00	Robot Adapter, (Sleeve & Tubing Not Included)	N/A
01	Adapter (FANUC); 15' Tubing Lg.	A11071-111
02	Adapter (ABB); 15' Tubing Lg.	A11071-121
03	Adapter (FANUC - P200); 15' Tubing Lg.	A11071-131
04	Adapter (Kawasaki - KE610L); 15' Tubing Lg.	A11071-141
05	Adapter (Motoman - PX2850); 15' Tubing Lg.	A11071-151
06	Adapter (Motoman - PX2900); 15' Tubing Lg.	A11071-161
07	Adapter (B & M - LZ2000); 15' Tubing Lg.	A11071-171
08	Adapter (FANUC); 30' Tubing Lg.	A11071-211
09	Adapter (ABB); 30' Tubing Lg.	A11071-221
10	Adapter (FANUC - P200); 30' Tubing Lg.	A11071-231
11	Adapter (Kawasaki - KE610L); 30' Tubing Lg.	A11071-241
12	Adapter (Motoman - PX2850); 30' Tubing Lg.	A11071-251
13	Adapter (Motoman - PX2900); 30' Tubing Lg.	A11071-261
14	Adapter (B & M - LZ2000); 30' Tubing Lg.	A11071-271

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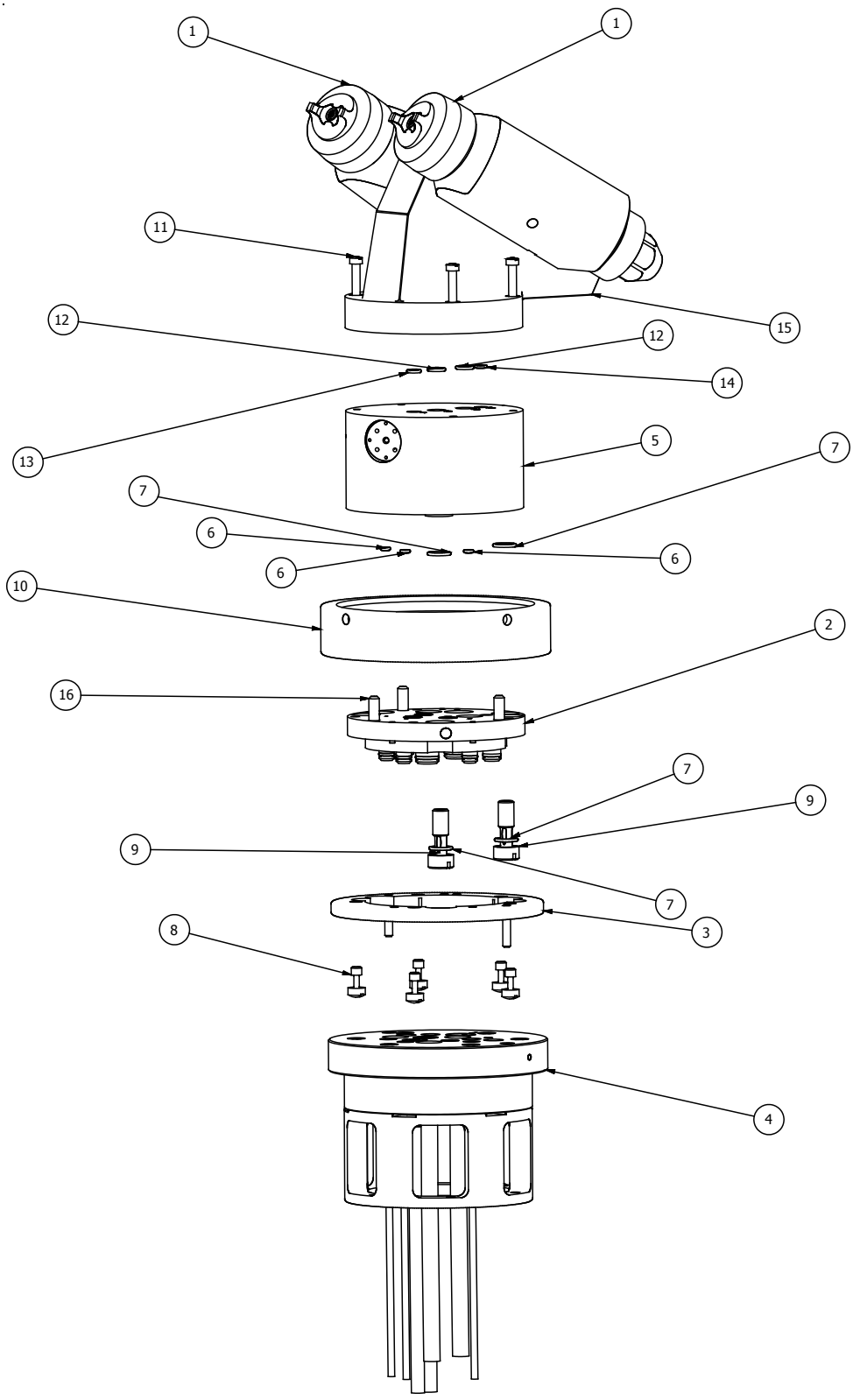

Figure 10: A11279-XX 60° Dual-Head Applicator Assembly

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A11279-XX 60° DUAL-HEAD APPLICATOR ASSEMBLY - PARTS LIST (Figure 10)			
Item #	Part #	Description	Qty
1	79138-03	Assembly, Head, Evolver NE	2
2	A11206-00	Assembly, Applicator Rear Plate	1
3	A11203-00	Assembly, Break-Away Ring	1
4	See Table B - "B"	Assembly, Tubing Bundle, Evolver NE	1
5	A11282-00	Assembly, Valve Block, Evolver NE	1
6	79001-38	O-Ring, Solvent Proof	3
7	79001-07	O-Ring, Solvent Proof	4
8	77524-00	Screw, Break-Away	5
9	77508-00	Bolt, Air	2
10	A11201-00	Ring, Quick Disconnect	1
11	LSFA0015-00	Screw, #10-32 X 1" Lg., Filister G-10	4
12	79001-06	O-Ring, Solvent Proof	2
13	79001-13	O-Ring, Solvent Proof	1
14	79001-04	O-Ring, Solvent Proof	1
15	A11278-00	Assembly, 60° Dual Block	1
16	7959-24C	Screw, 1/4-20 X 3/4" Lg., SHCS	3

TABLE B - TUBING BUNDLE 60° DUAL-HEAD ASSEMBLY		
Dash No.	Description	"B"
00	Robot Adapter, (Sleeve & Tubing Not Included)	N/A
01	Adapter (FANUC); 15' Tubing Lg.	A11071-112
02	Adapter (ABB); 15' Tubing Lg.	A11071-122
03	Adapter (FANUC - P200); 15' Tubing Lg.	A11071-132
04	Adapter (Kawasaki - KE610L); 15' Tubing Lg.	A11071-142
05	Adapter (Motoman - PX2850); 15' Tubing Lg.	A11071-152
06	Adapter (Motoman - PX2900); 15' Tubing Lg.	A11071-162
07	Adapter (B & M - LZ2000); 15' Tubing Lg.	A11071-172
08	Adapter (FANUC); 30' Tubing Lg.	A11071-212
09	Adapter (ABB); 30' Tubing Lg.	A11071-222
10	Adapter (FANUC - P200); 30' Tubing Lg.	A11071-232
11	Adapter (Kawasaki - KE610L); 30' Tubing Lg.	A11071-242
12	Adapter (Motoman - PX2850); 30' Tubing Lg.	A11071-252
13	Adapter (Motoman - PX2900); 30' Tubing Lg.	A11071-262
14	Adapter (B & M - LZ2000); 30' Tubing Lg.	A11071-272

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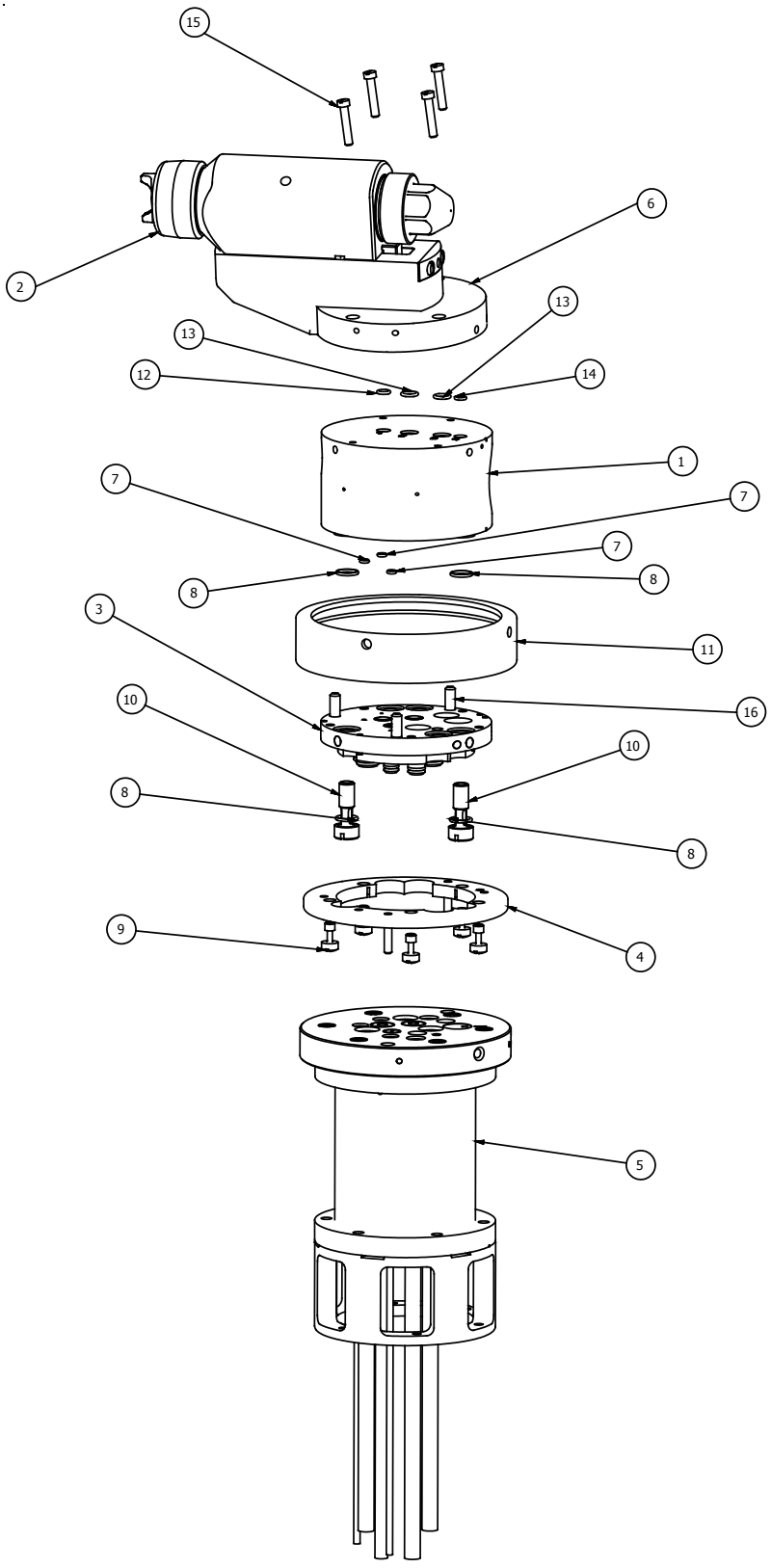

Figure 11: A11776-XX 90° Single-Head Applicator Assembly

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A11776-XX 90° SINGLE-HEAD APPLICATOR ASSEMBLY - PARTS LIST (Figure 11)			
Item #	Part #	Description	Qty
1	A11282-00	Assembly, Valve Block, Evolver NE	1
2	79138-03	Assembly, Head Robot Applicator	2
3	A11206-00	Assembly, Applicator Rear Plate	1
4	A11203-00	Assembly, Break-Away Ring	1
5	See Table C - "B"	Assembly, Tubing Bundle, Evolver NE	1
6	A11776-00	Assembly, 90° Single Block	1
7	79001-38	O-Ring, Solvent Proof	3
8	79001-07	O-Ring, Solvent Proof	4
9	77524-00	Screw, Break-Away	5
10	77508-00	Bolt, Air	2
11	A11201-00	Ring, Quick Disconnect	1
12	79001-13	O-Ring, Solvent Proof	1
13	79001-06	O-Ring, Solvent Proof	2
14	79001-04	O-Ring, Solvent Proof	1
15	LSF0015-00	Screw, #10-32 X 1" Lg., Filister G-10	4
16	7959-24C	Screw, 1/4-20 X 3/4" Lg., HCS	3

TABLE C - TUBING BUNDLE 90° SINGLE-HEAD aSSEMBLY		
Dash No.	Description	"B"
00	Robot Adapter, (Sleeve & Tubing Not Included)	N/A
01	Adapter (FANUC); 15' Tubing Lg.	A11071-113
02	Adapter (ABB); 15' Tubing Lg.	A11071-123
03	Adapter (FANUC - P200); 15' Tubing Lg.	A11071-133
04	Adapter (Kawasaki - KE610L); 15' Tubing Lg.	A11071-143
05	Adapter (Motoman - PX2850); 15' Tubing Lg.	A11071-153
06	Adapter (Motoman - PX2900); 15' Tubing Lg.	A11071-163
07	Adapter (B & M - LZ2000); 15' Tubing Lg.	A11071-173
08	Adapter (FANUC); 30' Tubing Lg.	A11071-213
09	Adapter (ABB); 30' Tubing Lg.	A11071-223
10	Adapter (FANUC - P200); 30' Tubing Lg.	A11071-233
11	Adapter (Kawasaki - KE610L); 30' Tubing Lg.	A11071-243
12	Adapter (Motoman - PX2850); 30' Tubing Lg.	A11071-253
13	Adapter (Motoman - PX2900); 30' Tubing Lg.	A11071-263
14	Adapter (B & M - LZ2000); 30' Tubing Lg.	A11071-273

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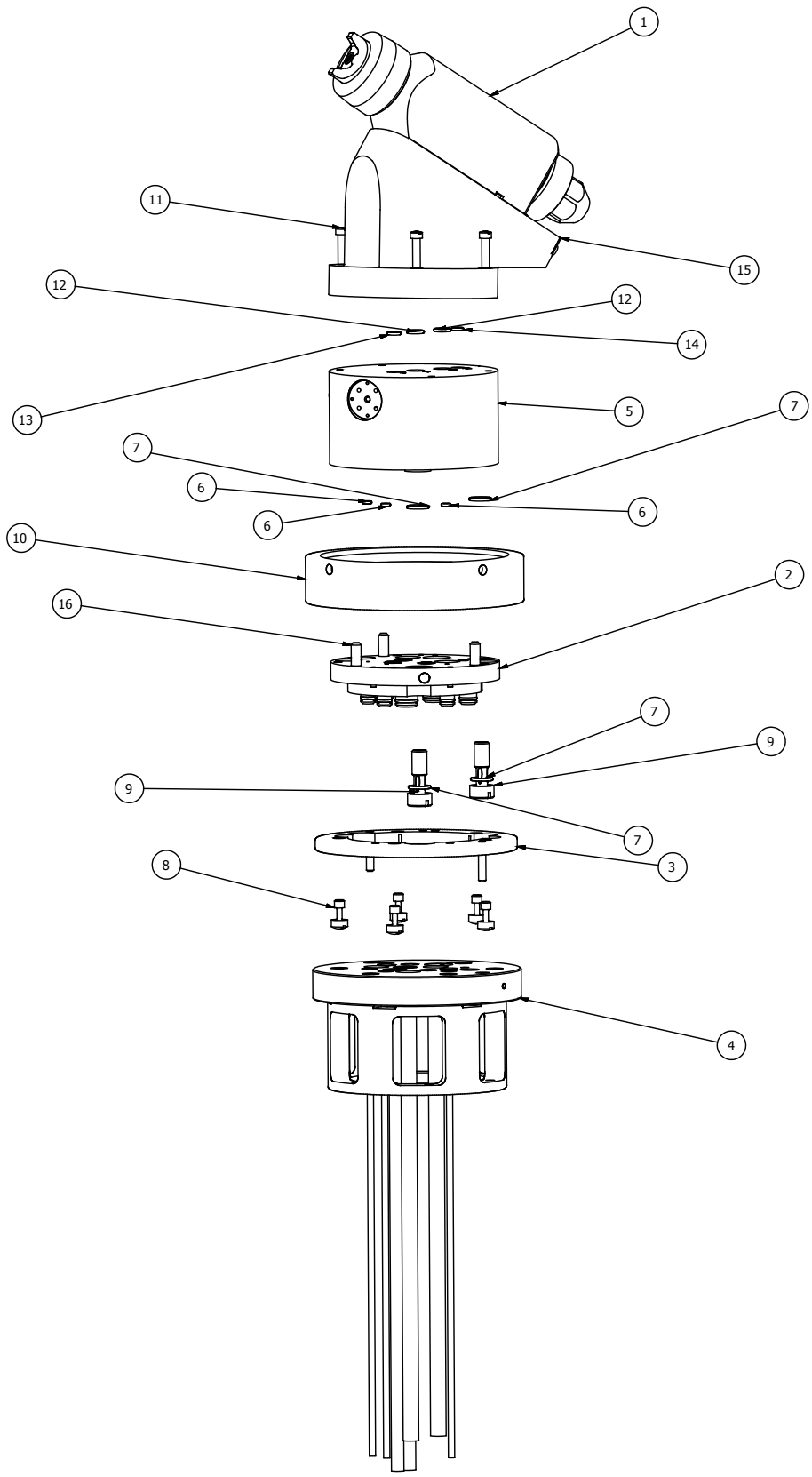

Figure 12: A11775-XX 60° Single-Head Applicator Assembly

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A11775-XX 60° SINGLE-HEAD APPLICATOR ASSEMBLY - PARTS LIST (Figure 12)			
Item #	Part #		Qty
1	79138-03	Assembly, Head, Evolver NE	2
2	A11206-00	Assembly, Applicator Rear Plate	1
3	A11203-00	Assembly, Break-Away Ring	1
4	See Table D - "B"	Assembly, Tubing Bundle, Evolver NE	1
5	A11282-00	Assembly, Valve Block, Evolver NE	1
6	79001-38	O-Ring, Solvent Proof	3
7	79001-07	O-Ring, Solvent Proof	4
8	77524-00	Screw, Break-Away	5
9	77508-00	Bolt, Air	2
10	A11201-00	Ring, Quick Disconnect	1
11	LSFA0015-00	Screw, #10-32 X 1" Lg., Filister G-10	4
12	79001-06	O-Ring, Solvent Proof	2
13	79001-13	O-Ring, Solvent Proof	1
14	79001-04	O-Ring, Solvent Proof	1
15	A11775-00	Assembly, 60° Single Block	1
16	7959-24C	Screw, 1/4-20 X 3/4" Lg., SHCS	3

TABLE D - TUBING BUNDLE 60° SINGLE-HEAD ASSEMBLY		
Dash No.	Description	"B"
00	Robot Adapter, (Sleeve & Tubing Not Included)	N/A
01	Adapter (FANUC); 15' Tubing Lg.	A11071-110
02	Adapter (ABB); 15' Tubing Lg.	A11071-120
03	Adapter (FANUC - P200); 15' Tubing Lg.	A11071-130
04	Adapter (Kawasaki - KE610L); 15' Tubing Lg.	A11071-140
05	Adapter (Motoman - PX2850); 15' Tubing Lg.	A11071-150
06	Adapter (Motoman - PX2900); 15' Tubing Lg.	A11071-160
07	Adapter (B & M - LZ2000); 15' Tubing Lg.	A11071-170
08	Adapter (FANUC); 30' Tubing Lg.	A11071-210
09	Adapter (ABB); 30' Tubing Lg.	A11071-220
10	Adapter (FANUC - P200); 30' Tubing Lg.	A11071-230
11	Adapter (Kawasaki - KE610L); 30' Tubing Lg.	A11071-240
12	Adapter (Motoman - PX2850); 30' Tubing Lg.	A11071-250
13	Adapter (Motoman - PX2900); 30' Tubing Lg.	A11071-260
14	Adapter (B & M - LZ2000); 30' Tubing Lg.	A11071-270

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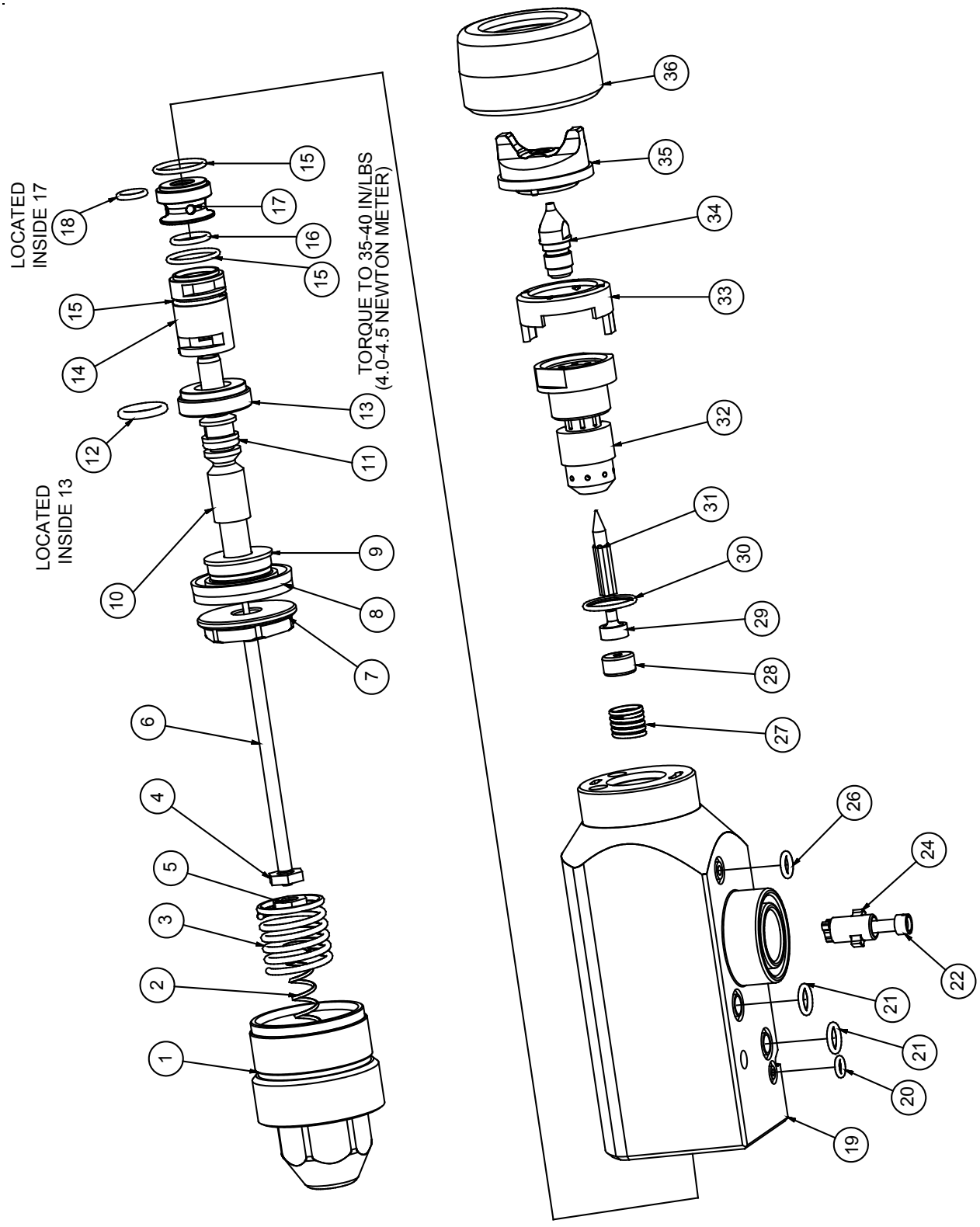

Figure 13: 79138-03 Spray Head Assembly

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79138-03 SPRAY HEAD ASSEMBLY - PARTS LIST (Figure 13)

Item #	Part #	Description	Qty
1	79148-00	End Cap, Spray Head	1
2	17615-00	Spring, Compression	1
3	9334-00	Spring, Valve Return	1
4	7733-07	Nut, Jam, 10-32	1
5	76199-00	Nut, Adjustment Rear	1
6	79151-00	Assembly, Needle Shaft	1
7	79147-00	Nut, Piston	1
8	7723-06	Piston, U-Cup	1
9	79145-00	Plate, Piston	1
10	79144-00	Shaft, Air Valve	1
11	79001-28	O-Ring, Solvent Proof	1
12	79001-29	O-Ring, Solvent Proof	1
13	79146-00	Seal Carrier, Rear Piston	1
14	79143-00	Bushing, Air Valve	1
15	79001-01	O-Ring, Solvent Proof	3
16	13076-13	O-Ring, Solvent Proof	1
17	79172-00	Carrier, Rear Seal	1
18	79001-06	O-Ring, Solvent Proof	1
19	79137-00	Head, Machining	1
20	79001-04	O-Ring, Solvent Proof	1
21	79001-06	O-Ring, Solvent Proof	2
22	79142-00	Screw, SHCS.	1
24	79141-00	Plug, Connection	1
26	79001-05	O-Ring, Solvent Proof	1
27	RME-38	Return Spring, Piston	1
28	EMF-7	Seal, Washer	1
29	RME-32	Seal	1
30	79001-01	O-Ring, Solvent Proof	1
31	A11218-00	Needle Tip, High Wear	1
32	EMF-195	Nozzle, Fluid Hole (8)	1
33	EMF-192	Locator, Air Cap	1
34	79140-01	Fluid Tip, .042 Diameter (Optional)	1
	79140-02	Fluid Tip, .055 Diameter	1
	79140-03	Fluid Tip, .070 Diameter (Optional)	1
35	79153-65R-1	Air Cap, Certified 65R-1	1
	79196-98-1	Air Cap, Certified 98-1 (Optional)	1
	79197-63-1	Air Cap, Certified 63-1 (Optional)	1
36	79154-00	Ring, Retaining	1

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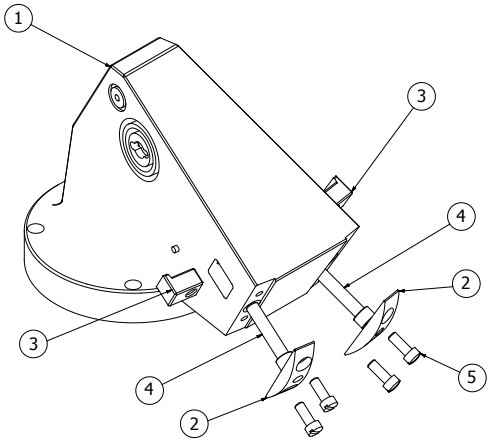

Figure 14: A11278 60° Dual-Head Block

A11278 60° DUAL-HEAD BLOCK - PARTS LIST (Figure 14)			
Item #	Part #	Description	Qty
1	A11220-00	Block, 60° Dual-Head, Evolver NE	1
2	79184-00	Plate, Retention	2
3	79173-00	Block, Locking	2
4	79174-00	Screw, Nylon 1/4-20 x 1 1/4" Lg.	2
5	79149-00	Screw, Retaining 10-32 x .50" Lg.	4

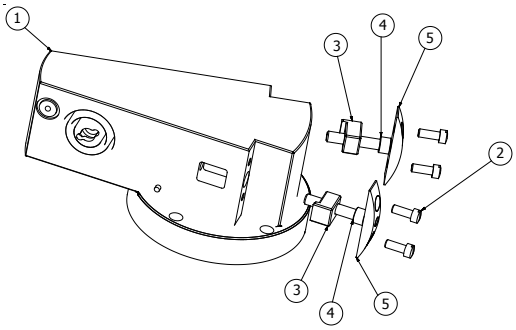

Figure 15: A11280 90° Dual-Head Block

A11280 90° DUAL-HEAD BLOCK - PARTS LIST (Figure 15)			
Item #	Part #	Description	Qty
1	A11222-00	Block, 90° Dual-Head, Evolver NE	1
2	79149-00	Screw, Retaining 10-32 X .50" Lg.	4
3	79173-00	Block, Locking	2
4	79174-00	Screw, Nylon 1/4-20 X 1 1/4" Lg.	2
5	79184-00	Plate, Retention	2

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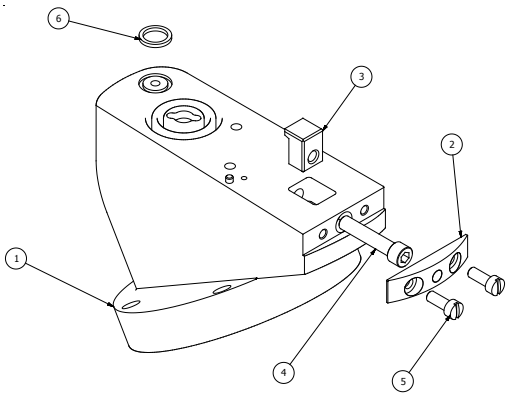

Figure 16: A11773 60° Single-Head Block

A11773 60° SINGLE-HEAD BLOCK - PARTS LIST (Figure 16)			
Item #	Part #	Description	Qty
1	A11772-00	Block, 60° Single-Head, Evolver NE	1
2	79184-00	Plate, Retention	1
3	79173-00	Block, Locking	1
4	79174-00	Screw, Nylon 1/4-20 x 1 1/4" Lg.	1
5	79149-00	Screw, Retaining 10-32 x .50" Lg.	2
6	A10612-00	Plate, Retention	1

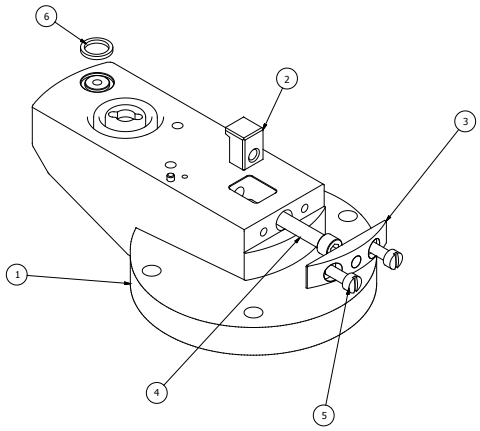

Figure 17: A11774 90° Single-Head Block

A11774 90° SINGLE-HEAD BLOCK- PARTS LIST (Figure 17)			
Item #	Part #	Description	Qty
1	A11771-00	Block, 90° Dual-Head, Evolver NE	1
2	79173-00	Block, Locking	1
3	79184-00	Plate, Retention	1
4	79174-00	Screw, Nylon 1/4-20 X 1 1/4" Lg.	1
5	79149-00	Screw, Retaining, 10-32 X .50" Lg.	2
6	A10612-00	Plate, Retention	1

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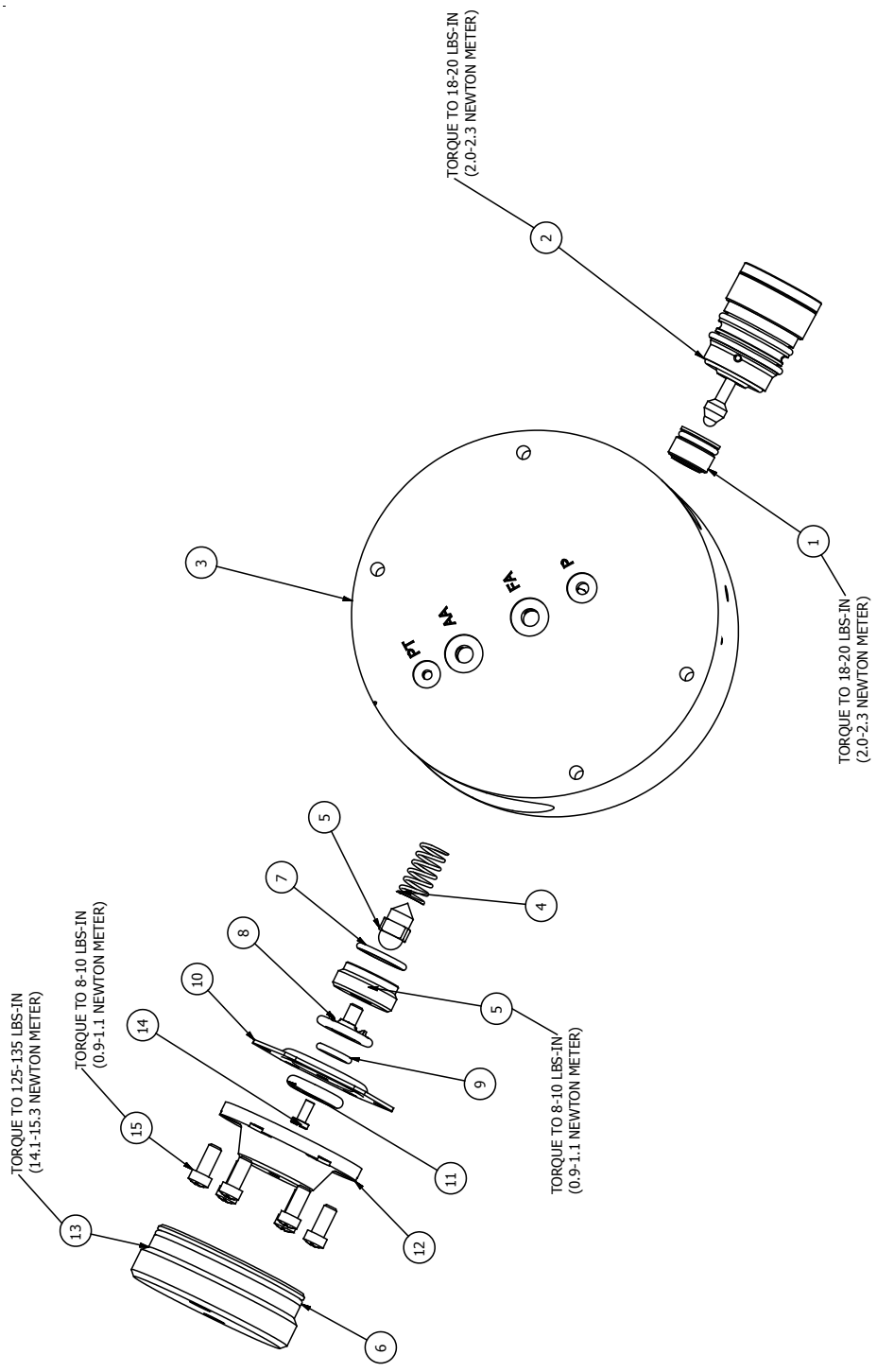

Figure 18: A11282 Valve / Regulator Block Assembly

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A11282 VALVE/REGULATOR BLOCK ASSEMBLY - PARTS LIST (Figure 18)			
Item #	Part #	Description	Qty
1	77367-00	Valve Seat Assembly	1
2	78949-00	Fluid Valve Assembly	1
3	A11221-00	Block, Manifold, Evolver NE	1
4	74161-00	Spring, Regulator	1
5	77354-00	Assembly, Needle Seat	1
6	79001-35	O-Ring, Solvent Proof	1
7	79001-08	O-Ring, Solvent Proof	1
8	79221-00	Lower Plate, Regulator	1
9	79001-06	O-Ring, Solvent Proof	1
10	79220-00	Diaphragm	1
11	79222-00	Upper Plate, Regulator	1
12	A10741-00	Bonnet, Regulator	1
13	A10740-00	Cap, Regulator	1
14	76374-08C	Screw	1
15	A10746-00	Screw, Retaining, 10-32 X 1.50"	6

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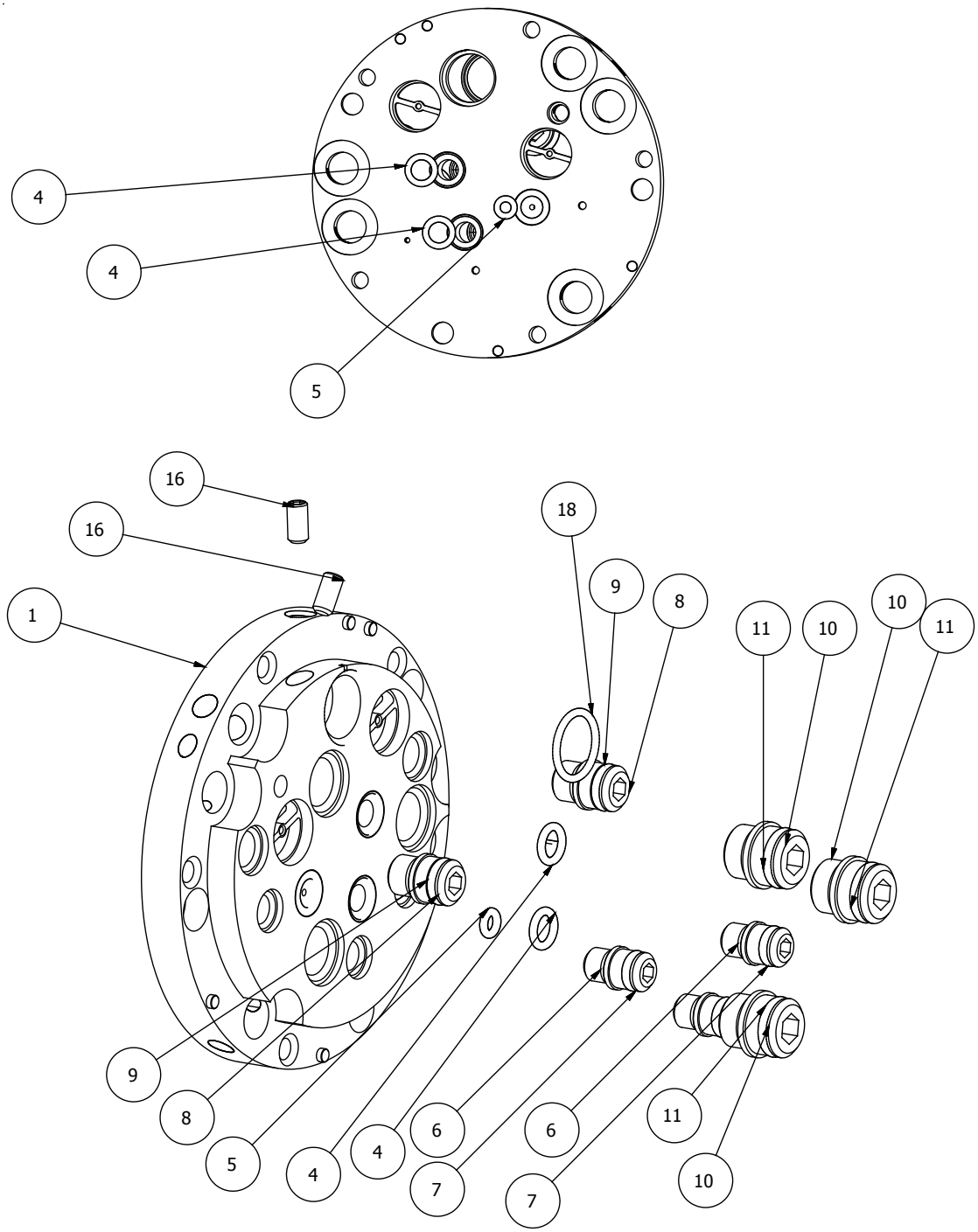

Figure 19: A11206 Rear Manifold Plate Assembly

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A11206 REAR MANIFOLD PLATE ASSEMBLY - PARTS LIST (Figure 19)			
Item #	Part #	Description	Qty
1	A11205-00	Assembly, Plate, Rear RMA-303 Single Purge	1
2	----	----	--
3	----	----	--
4	79001-40	O-Ring, Solvent Proof	4
5	79001-39	O-Ring, Solvent Proof	2
6	77507-00	Air Stud, Small Machined	3
7	79001-05	O-Ring, Solvent Proof	3
8	77506-00	Air Stud, Medium Machined	2
9	79001-06	O-Ring, Solvent Proof	2
10	77505-00	Air Stud, Large	3
11	79001-07	O-Ring, Solvent Proof	3
12	----	----	--
13	----	----	--
14	----	----	--
15	----	----	--
16	SSF-2052	Set	2
17	79001-09	O-Ring, Solvent Proof	1

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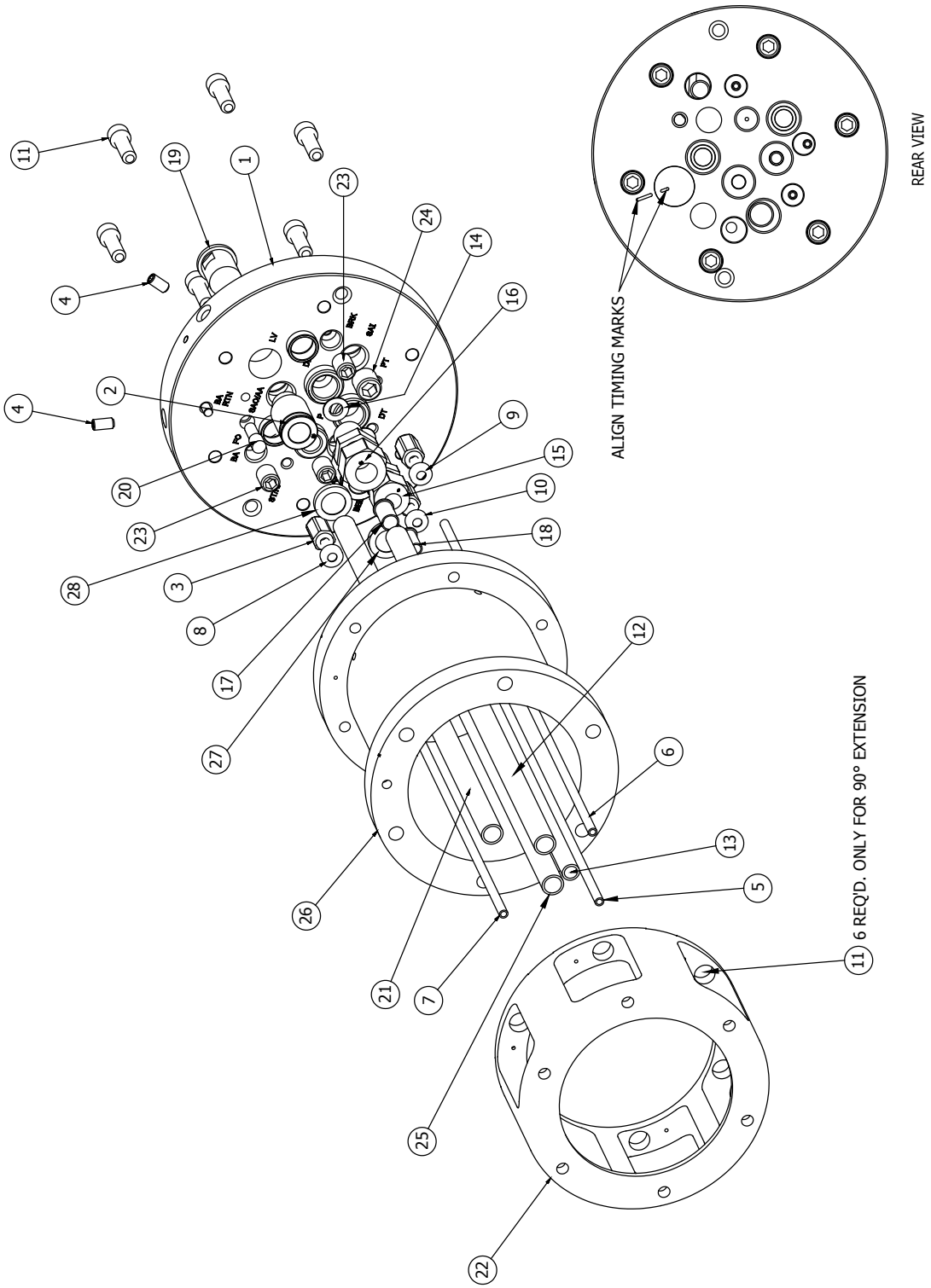

Figure 20: A11071-XXX Tubing Bundle Assembly

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A11071-XXX TUBING BUNDLE ASSEMBLY - PARTS LIST (Figure 20)

Item #	Part #	Description	Qty	Port Location
1	A11062-00	Assembly, Robot Mounting Plate	1	----
2	A10891-04	Fitting, 1/4" BSP X 10mm ODT, Straight	2	SAO/AA, TA/FA
3	77544-01	Male Connector, 4mm ODT X 10-32 Thd.	3	DT, PT, ST/RP
4	SSF-2052	Set Secrew, 3/8" Lg. X 10-24	2	----
5	77536-06	Tube, 4mm OD X 2.7mm ID (Silver)	See Table A - "H"	DT
6	77536-03	Tube, 4mm OD X 2.7mm ID (Green)	See Table A - "H"	PT
7	77536-04	Tube, 4mm OD X 2.7mm ID (Blue)	See Table A - "H"	ST/RP
8	77545-01	Cap, 5/32" OD Tube, Blue Identification	1	ST/RP
9	77545-03	Cap, 5/32" OD Tube, Green Identification	1	PT
10	77545-11	Cap, 5/32" OD. Tube, Gray Identification	1	DT
11	See Table C - "E"	Screw, 1/4-20 SHCS	See Table C - "F"	----
12	A10841-01	Tubing, 10mm OD X 8mm ID	See Table A - "H"	DL
13	A10841-02	Tubing, PFA, 8mm OD X 6mm ID	See Table A - "H"	P
14	A11063-00	Insert, Fluid	2	D, P
15	A10890-02	Fitting, 8mm ODT X 1/4" BSP	1	P
16	A10890-03	Fitting, 10mm ODT X 1/4" BSP	1	DL
17	A10895-01	Insert Metric Tube, 10mm	1	DL
18	A10895-02	Insert, Metric Tube, 8mm OD	1	P
19	A11070-00	Plug, Low Voltage	1	LV
20	A11074-00	Plug, Fiber Optic Cable	1	FO
21	A10839-03	Tube, 10mm OD X 8mm ID (Gray)	See Table A - "H"	SAO/AA
22	See Table B - "M"	Plate, Robot Spacer	1	----
23	A11073-00	Plug, 1/8-28 BSP	3	SOL, BA, BRK
24	A11072-00	Plug, 1/4" BSP	1	SAI
25	A10839-07	Tube, 10mm OD X 8mm ID (Blue)	See Table A - "H"	TA/FA
26	See Table C - "D"	Sleeve, Extension	1	----
27	A11207-10	Cap, 10mm OD Tube, Blue Identification	1	TA/FA
28	A11207-08	Cap, 10mm OD Tube, Gray Identification	1	SAO/AA

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A11071-XXX TUBING BUNDLE ASSEMBLY MODEL IDENTIFICATION

When ordering, use A11071-XXX as indicated by Tables A through C. Three digits must follow the basic part number. For example:

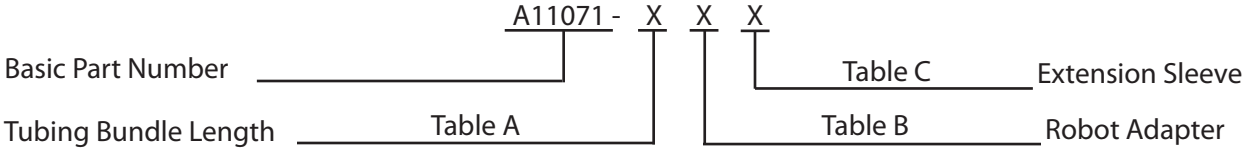

TABLE A - TUBING BUNDLE LENGTH		
Dash No.	Description	"H"
0	Air Tubing (Not Included)	----
1	15 Ft. Long Tubing Assembly	15 Ft.
2	30 Ft. Long Tubing Assembly	30 Ft.

TABLE B - ROBOT ADAPTER		
Dash No.	Description	"M"
0	Adapter (Not Included)	----
1	Adapter (FANUC)	78983-00
2	Adapter (ABB)	79107-00
3	Adapter (FANUC - P200)	79131-00
4	Adapter (Kawasaki - KE610L)	A10847-00
5	Adapter (Motoman - PX2850)	A10848-00
6	Adapter (Motoman - PX2900)	A10849-00
7	Adapter (B & M - LZ2000)	A10851-00

TABLE C - EXTENSION SLEEVE				
Dash No.	Description	"D"	"E"	"F"
0	No Sleeve	----	7959-24C	6
1	Sleeve, Extenion 90°, Dual-Head	A11113-00	7959-24C	12
2	Sleeve, Extension 60°, Dual-Head	A11114-00	7959-56C	6
3	Sleeve, Extension 90°, Single-Head	A11778-00	7959-24C	12

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SERVICE PARTS						
Part #	Description	Number of Guns				Notes
		1-2	3-4	5-6	7-8	
79138-03	Complete Head Assembly	1	2	2	3	
79153-65R-1	Air Cap	1	2	3	4	79196-98-1, 79197-63-1 (Optional Air Caps)
79140-02	Fluid Tip	1	2	3	4	01=.042,03=.070 (Optional Fluid Tips)
A11218-00	Needle Tip	1	2	3	4	
79142-00	Screw	2	2	4	4	
79141-00	Plug, Connection	2	2	4	4	
79144-00	Shaft, Air Valve	1	1	2	2	
79143-00	Bushing, Air Valve	1	1	2	2	
79173-00	Block, Locking	2	2	4	4	
79174-00	Screw	1	1	2	2	
77367-00	Seat Assembly	1	1	2	2	

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REPAIR KITS

Part #	Description	Number of Guns				Notes
		1-2	3-4	5-6	7-8	
A10409 9208-00	Regulator Repair Kit	1	2	2	3	If applicator is equipped with Regulator it Includes: 1 Ea. - 79220-00 Diaphragm 1 Ea. - 74161-00 Spring 1 Ea. - 77354-00 Needle & Seat 1 Ea. - 79001-08 O-Ring (Solvent Proof)
A10410	Spray Head Mounting Seal O-Ring Kit	1	2	3	4	Includes: 1 Ea. - 79001-04 O-Ring (Solvent Proof) 2 Ea. - 79001-06 O-Ring (Solvent Proof) 1 Ea. - 79001-05 O-Ring (Solvent Proof)
A10411	Spray Head Repair Kit	1	2	3	4	Includes: 1 Ea. - 79151-00 Needle Shaft 1 Ea. - 7723-06 Piston, U-Cup 1 Ea. - 7554-111 O-Ring (Solvent Proof) 1 Ea. - 7554-28 O-Ring (Solvent Proof) 3 Ea. - 7554-42 O-Ring (Solvent Proof) 1 Ea. - 13076-13 O-Ring 1 Ea. - 7554-08 O-Ring (Solvent Proof) 1 Ea. - RME-38 Spring 1 Ea. - RME-32 Seal 1 Ea. - 79001-01 O-Ring (Solvent Proof) 1 Ea. - 79001-04 O-Ring (Solvent Proof) 2 Ea. - 79001-06 O-Ring (Solvent Proof) 1 Ea. - 79001-05 O-Ring (Solvent Proof) 2 Ea. - 14061-09 Conductive Foam 1 Ea. - 79171-00 Contact Spring

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ACCESSORIES

Accessories for the Evolver NE Solventborne Spray Applicators include:

75777-XX	Applicator Covers
74035-XX	Test Air Cap and Gauge Assy.
73896-01	Air Cap Protector
79203-00	Tool Kit
A10742	Regulator Cap Tool
A10409	Regulator Repair Kit
A10410	Spray Head Plate O-Ring Kit
A10411	Spray Head Repair Kit

75777-XX APPLICATOR COVERS	
Part #	Description
75777-02	Dual-Head Applicator
75777-03	Robot Wrist Flange

74035-XX TEST AIR CAPS AND GAUGE ASSEMBLY	
Part #	Description
74035-21	#65R-1 Test Cap
74035-22	#98-1 Test Cap
74035-23	#63-1 Test Cap
74035-24	#48-1 Test Cap
74035-25	#481-1 Test Cap

The 74035 Test Air Cap and Gauge Assembly is designed for use with a Test Station or while the gun is connected to the robot or reciprocator. The test air cap is comprised of two air pressure gauges, pressure gauge stand, special 74061-XX air caps, and all required tubing and fittings.
The air cap has two tappered holes for small barbed tube fittings. The fittings are located so that the gauges connected to them will measure the actual cap pressure of the atomization and pattern air. Using this test cap will assure uniform atomization and pattern quality, regardless of air supply tube lengths from one applicator to another.

73896-01 Air Cap Protector

This is a plastic cylinder that fits over the air cap retainer. The protector keeps the air cap and other spray head parts from being damaged during booth cleaning and at other times when the spray applicator is not in use.

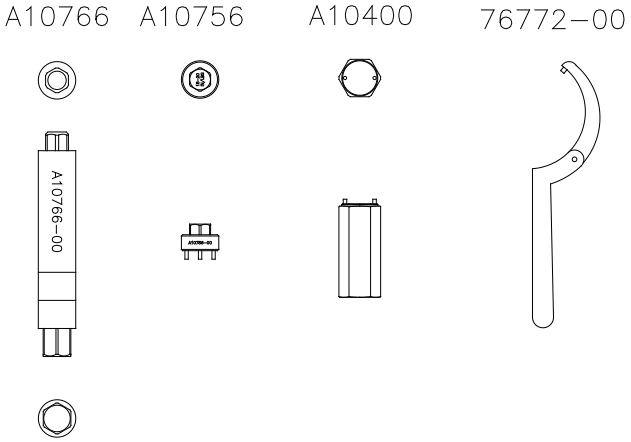
79203-00 Tool Kit

Provided with each applicator is a tool kit to aid in the disassembly and assembly of the applicator during servicing.

A10742 Regulator Cap Tool

Used to remove the fluid regulator cap.

79203-00 TOOL KIT (For Dual Head Applicators)	
Part #	Description
A10756-00	Valve Removal Tool
A10766-00	Valve Seat Removal Tool
76772-00	Retaining Ring Spanner
A10400-00	Seal Carrier Tool



79203-00 Tool Kit

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A10409 REGULATOR REPAIR KIT - PARTS LIST

Part #	Description	Qty
79220-00	Diaphragm	1
74161-00	Spring	1
77354-00	Needle & Seat	1
79001-08	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	1

A10410 SPRAY HEAD PLATE O-RING KIT - PARTS LIST

Part #	Description	Qty
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	2
79001-05	O-Ring, Solvent Proof	1

A10411 SPRAY HEAD REPAIR KIT - PARTS LIST

Part #	Description	Qty
79151-00	Needle Shaft	1
7723-06	Piston, U-Cup	1
79001-28	O-Ring, Solvent Proof	1
79001-29	O-Ring, Solvent Proof	1
13076-13	O-Ring	1
RME-38	Spring	1
RME-32	Seal	1
79001-01	O-Ring, Solvent Proof	4
79001-04	O-Ring, Solvent Proof	1
79001-06	O-Ring, Solvent Proof	3
79001-05	O-Ring, Solvent Proof	1

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WARRANTY POLICIES

LIMITED WARRANTY

Ransburg will replace or repair without charge any part and/or equipment that fails within the specified time (see below) because of faulty workmanship or material, provided that the equipment has been used and maintained in accordance with Ransburg's written safety and operating instructions, and has been used under normal operating conditions. Normal wear items are excluded.

THE USE OF OTHER THAN RANSBURG APPROVED PARTS VOIDS ALL WARRANTIES.

SPARE PARTS: One hundred and eighty (180) days from date of purchase, except for rebuilt parts (any part number ending in "R") for which the warranty period is ninety (90) days.

EQUIPMENT: When purchased as a complete unit, (i.e., guns, power supplies, control units, etc.), is one (1) year from date of purchase. WRAPPING THE APPLICATOR IN PLASTIC, SHRINK-WRAP, OR ANY OTHER NON-APPROVED COVERING , WILL VOID THIS WARRANTY.

RANSBURG'S ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPLACE PARTS THAT HAVE FAILED BECAUSE OF FAULTY WORKMANSHIP OR MATERIALS. THERE ARE NO IMPLIED WARRANTIES NOR WARRANTIES OF EITHER MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. RANSBURG ASSUMES NO LIABILITY FOR INJURY, DAMAGE TO PROPERTY OR FOR CONSEQUENTIAL DAMAGES FOR LOSS OF GOODWILL OR PRODUCTION OR INCOME, WHICH RESULT FROM USE OR MISUSE OF THE EQUIPMENT BY PURCHASER OR OTHERS.

EXCLUSIONS:

If, in Ransburg's opinion the warranty item in question, or other items damaged by this part was improperly installed, operated or maintained, Ransburg will assume no responsibility for repair or replacement of the item or items. The purchaser, therefore will assume all responsibility for any cost of repair or replacement and service related costs if applicable.

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MANUAL CHANGE SUMMARY

This manual was published to supercede Service Manual AA-05-01.4 Evolver NE Solventborne Robotic Atomizers to make the following changes:

1. Removed "Service Manual Price - Euro" on the "Front and Back Covers".

2. Changed logo.

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Service Manual Price: $50.00 (U.S.)

Manufacturing
1910 North Wayne Street
Angola, Indiana 46703-9100
Telephone: 260/665-8800
Fax: 260/665-8516

Technical/Service Assistance

Automotive Assembly and Tier I	Telephone: 800/ 626-3565	Fax: 419/ 470-2040
Industrial Systems	Telephone: 800/ 233-3366	Fax: 419/ 470-2071
Ransburg Guns	Telephone: 800/ 233-3366	Fax: 419/ 470-2071

www.ransburg.com

Technical Support Representative will direct you to the appropriate telephone number for ordering Spare Parts.

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